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AGREEMENT

CONCERNING THE ADOPTION OF UNIFORM CONDITIONS OF APPROVAL AND RECIPROCAL RECOGNITION OF APPROVAL FOR MOTOR VEHICLE EQUIPMENT AND PARTS

done at Geneva on 20 March 1958

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UNIFORM PROVISIONS CONCERNING THE APPROVAL OF FILAMENT LAMPS FOR USE IN APPROVED LAMP UNITS OF POWER DRIVEN VEHICLES AND OF THEIR TRAILERS

UNITED NATIONS

Regulation No. 37

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF FILAMENT LAMPS FOR USE IN APPROVED LAMP UNITS OF POWER DRIVEN VEHICLES AND OF THEIR TRAILERS

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Regulation No. 37

UNIFORM PROVISIONS CONCERNING THE APPROVAL OF FILAMENT LAMPS FOR USE IN APPROVED LAMP UNITS OF POWER DRIVEN VEHICLES AND OF THEIR TRAILERS

1. SCOPE

This Regulation applies to filament lamps shown in annex 1 and intended for use in approved lamp units of power driven vehicles and of their trailers.

2. ADMINISTRATIVE PROVISIONS

2.1. Definitions

2.1.1. Definition of "category"

The term "category" is used in this Regulation to describe different basic design of standardized filament lamps. Each category has a specific designation, as for example: "F1", "P21W", "T4W".

2.1.2. Definition of "type"

Filament lamps of different "types" are lamps within the same category which differ in such essential respects as:

2.1.2.1. trade name or mark; 1/

2.1.2.2. bulb design, in so far as these differences affect the optical results;

2.1.2.3. bulb colour

A selective-yellow bulb or an additional selective-yellow outer bulb, solely intended to change the colour but not the other characteristics of a colourless filament lamp, does not constitute a change of type of the filament lamp;

2.1.2.4. rated voltage.

1/ Filament lamps bearing the same trade name or mark but produced by different manufacturers are considered as being of different types. Filament lamps produced by the same manufacturer differing only by the trade name or mark may be considered to be of the same type.

2.2. Application for approval

2.2.1. The application for approval shall be submitted by the owner of the trade name or mark, or by his duly accredited representative.

2.2.2. Every application for approval shall be accompanied (see also para. 2.4.2.) by:

2.2.2.1. drawings in triplicate, sufficiently detailed to permit identification of the type;

2.2.2.2. a brief technical description;

2.2.2.3. five samples of each colour which has been applied for.

2.2.3. In the case of a type of filament lamp differing only by the trade name or mark from a type that has already been approved it shall be sufficient to submit:

2.2.3.1. a declaration by the lamp manufacturer that the type submitted is identical (except in the trade name or mark) with and has been produced by the same manufacturer as, the type already approved, the latter being identified by its approval code;

2.2.3.2. two samples bearing the new trade name or mark.

2.2.4. The competent authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.

2.3. Inscriptions

2.3.1. Filament lamps submitted for approval shall bear on the cap or bulb: 2/

2.3.1.1. the trade name or mark of the applicant;

2.3.1.2. the rated voltage;

2.3.1.3. the international designation of the relevant category;

2.3.1.4. the rated wattage (in the sequence, principal filament/secondary filament for dual-filament lamps); this need not be indicated separately if it is part of the international designation of the relevant filament lamp category;

2/ In this latter case, the luminous characteristics shall not be adversely affected.

2.3.1.5. a space of sufficient size to accommodate the approval mark.

2.3.2. The space mentioned in paragraph 2.3.1.5. above shall be indicated in the drawings accompanying the application for approval.

2.3.3. Other inscriptions than those covered by paragraphs 2.3.1. and 2.4.3. may be affixed, on the condition that they do not adversely affect the luminous characteristics.

2.4. Approval

2.4.1. If all the samples of a type of filament lamp which are submitted in pursuance of paragraphs 2.2.2.3. or 2.2.3.2. above meet the requirements of this Regulation, approval shall be granted.

2.4.2. An approval code shall be assigned to each type approved. Its first character (at present 3 corresponding to the 03 series of amendments) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. This will be followed by an identification code comprising not more than two characters. Only the arabic numerals and capital letters listed in footnote 3/ shall be used. The same Contracting Party may not assign the same code to another type of filament lamp. Notice of approval or of extension or refusal or withdrawal of approval or production definitely discontinued of a type of filament lamp pursuant to this Regulation shall be communicated to the Parties to the 1958 Agreement which apply this Regulation by means of a form conforming to the model in annex 2 to this Regulation. If the applicant so desires the same approval code may be assigned to the colourless and to the selective-yellow filament lamp (see para. 2.1.2.3.).

2.4.3. To every filament lamp conforming to a type approved under this Regulation there shall be affixed in the space referred to in paragraph 2.3.1.5., in addition to the inscriptions required under paragraph 2.3.1., an international approval mark consisting of:

3/ 0 1 2 3 4 5 6 7 8 9
A B C D E F G H J K L M N P R S T U V W X Y Z

2.4.3.1. a truncated circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval; 4/

2.4.3.2. the approval code, placed close to the truncated circle.

2.4.4. If the applicant has obtained the same approval code for several trade names or marks, one or more of them will suffice to meet the requirements of paragraph 2.3.1.1.

2.4.5. The marks and inscriptions specified in paragraphs 2.3.1. and 2.4.3. shall be clearly legible and be indelible.

2.4.6. Annex 3 to this Regulation gives an example of arrangement of the approval mark.

3. TECHNICAL REQUIREMENTS

3.1. Definitions

3.1.1. Rated voltage: voltage (in volts) marked on the filament lamp;

3.1.2. Rated wattage: wattage (in watts) marked on the filament lamp which may be incorporated into the international designation of the relevant category;

3.1.3. Test voltage: voltage, at the filament lamp terminals for which the electrical and photometric characteristics of the filament lamp are intended and are to be tested;

3.1.4. Objective values: values to be achieved, within the specified tolerances, when the filament lamp is supplied with current at its test voltage;

4/ 1 for Germany, 2 for France, 3 for Italy, 4 for the Netherlands, 5 for Sweden, 6 for Belgium, 7 for Hungary, 8 for the Czech and Slovak Federal Republic, 9 for Spain, 10 for Yugoslavia, 11 for the United Kingdom, 12 for Austria, 13 for Luxembourg, 14 for Switzerland, 15 (vacant), 16 for Norway, 17 for Finland, 18 for Denmark, 19 for Romania, 20 for Poland, 21 for Portugal and 22 for the Russian Federation. Subsequent numbers will be assigned to other countries in the chronological order in which they ratify or accede to the Agreement concerning the Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts, and the numbers thus assigned shall be communicated to the Contracting Parties to the Agreement by the Secretary-General of the United Nations.

3.1.5. Standard filament lamp: a lamp with colourless bulb (except for amber filament lamps) and with reduced dimensional tolerances, used for the testing of lighting devices. Standard filament lamps are specified in only one voltage rating for each category;

3.1.6. Reference luminous flux: specified luminous flux of a standard filament lamp to which the optical characteristics of a lighting device shall be referred;

3.1.7. Measuring luminous flux: specified value of the luminous flux for testing a filament lamp in the standard headlamp as specified in paragraph 3.8;

3.1.8. Reference axis: an axis defined with reference to the cap and to which certain dimensions of the filament lamp are referred;

3.1.9. Reference plane: a plane defined with reference to the cap and to which certain dimensions of the filament lamp are referred.

3.2. General specifications

3.2.1. Each sample submitted shall conform to the relevant specifications of this Regulation.

3.2.2. Filament lamps shall be so designed as to be and to remain in good working order when in normal use. They shall moreover exhibit no fault in design or manufacture.

3.3. Manufacture

3.3.1. Filament lamp bulbs shall exhibit no scores or spots which might impair their efficiency and their optical performance.

3.3.2. Filament lamps shall be equipped with standard caps complying with the cap data sheets of IEC Publication 61, third edition, as specified on the individual lamp data sheets of annex 1.

3.3.3. The cap shall be strong and firmly secured to the bulb.

3.3.4. To ascertain whether filament lamps conform to the requirements of paragraphs 3.3.1. to 3.3.3. above, a visual inspection, a dimension check and, where necessary, a trial fitting shall be carried out.

3.4. Tests

3.4.1. Filament lamps shall first be aged at their test voltage for approximately one hour. For dual-filament lamps, each filament shall be aged separately.

3.4.2. In the case of a coloured bulb after the aging period corresponding to paragraph 3.4.1. the surface of the bulb shall be lightly wiped with a cotton cloth soaked in a mixture of 70 vol. % of n-heptane and 30 vol. % of toluol. After about five minutes, the surface shall be inspected visually. It must not show any apparent changes.

3.4.3. The position and dimensions of the filaments shall be measured with the filament lamps being supplied with current at from 90% to 100% of the test voltage.

3.4.4. Unless otherwise specified, electrical and photometric measurements shall be carried out at the test voltage.

3.4.5. Electrical measurements shall be carried out with instruments of at least class 0.2.

3.4.6. The luminous flux specified on the filament lamp data sheets of annex 1 is valid for filament lamps emitting white light, unless a special colour is stated there.

In the case where selective-yellow colour is allowed, the luminous flux of the filament lamp with selective-yellow outer bulb shall be at least 85% of the specified luminous flux of the relevant filament lamp with colourless bulb.

3.5. Filament position and dimensions

3.5.1. The geometric shapes of the filaments shall in principle be as specified on the lamp data sheets of annex 1.

3.5.2. For line filaments the correct position and shape shall be checked as specified in the relevant data sheets.

3.5.3. If the filament is shown on the lamp data sheet in at least one view as a point, the position of the luminous centre shall be determined in conformity with annex 4.

3.5.4. The length of a line filament shall be determined by its ends, defined - unless otherwise specified on the relevant data sheet - as the apices of the first and the last filament turn as seen in projection perpendicular to the reference axis of the lamp. Such an apex shall comply with the requirement that the angle formed by the legs shall not exceed 90°. In the case of coiled-coil filaments the apices of the secondary turns shall be taken into account.

3.5.4.1. For axial filaments the extreme position of the apices considered shall be determined by rotating the filament lamp about its reference axis. The length shall then be measured in a direction parallel to the reference axis.

3.5.4.2. For transverse filaments the filament axis shall be placed perpendicular to the direction of projection. The length shall be measured in a direction perpendicular to the reference axis.

3.6. Colour

3.6.1. The bulb of the filament lamp shall be colourless, 5/ unless otherwise prescribed on the relevant data sheet.

3.6.2. The colorimetric characteristics, expressed in CIE chromaticity coordinates, shall lie within the following limits:

finished filament lamps with selective yellow bulb or outer bulb

limit towards red:	$y \geq 0.138 + 0.580x$;
limit towards green:	$y \leq 1.29x - 0.100$;
limit towards white·	$y \geq -x + 0.966$;

($y \geq -x + 0.940$ and $y = 0.440$ for front fog lamps);

limit towards spectral value:

$$y \leq -x + 0.992;$$

finished filament lamps with amber bulb

limit towards red:	$y \geq 0.398$
limit towards green:	$y \leq 0.429$
limit towards white:	$z \leq 0.007$

3.6.3. The colour and the transmission of the bulb of filament lamps emitting coloured light shall be measured by the method specified in annex 5.

5/ A bulb is considered to be colourless if it does not appreciably alter the trichromatic coordinates of a luminous source having a colour temperature of 2856 K.

3.7. Observation concerning selective-yellow colour

An approval of a filament lamp type under this Regulation may be granted, pursuant to paragraph 3.6 above, for a filament lamp with a colourless as well as a selective-yellow bulb or outer bulb; article 3 of the Agreement to which this Regulation is annexed shall not prevent the Contracting Parties from prohibiting, on vehicles registered by them, lamps emitting either white or selective-yellow light.

3.8. Check on optical quality

(Applies solely to filament lamps with two filaments for headlamps emitting an asymmetrical passing beam).

3.8.1. This check of optical quality shall be carried out at a voltage such that the measuring luminous flux is obtained; the specifications of paragraph 3.4.6. are to be observed accordingly.

3.8.2. For 12-volt filament lamps emitting white light:

The sample which most nearly conforms to the requirements laid down for the standard filament lamp shall be tested in a standard headlamp as specified in paragraph 3.8.5. and it shall be verified whether the assembly comprising the aforesaid headlamp and the filament lamp being tested meets the light-distribution requirements laid down for the passing beam in the relevant Regulation.

3.8.3. For 6-volt and 24-volt filament lamps emitting white light:

The sample which most nearly conforms to the nominal dimension values shall be tested in a standard headlamp as specified in paragraph 3.8.5. and it shall be verified whether the assembly comprising the aforesaid headlamp and the filament lamp being tested meets the light-distribution requirements laid down for the passing-beam in the relevant Regulation. Deviations not exceeding 10% of the minimum values will be acceptable.

3.8.4. Filament lamps having a selective-yellow bulb or outer bulb shall be tested in the same manner as described in paragraphs 3.8.2. and 3.8.3. in a standard headlamp as specified in paragraph 3.8.5. to ensure that the illumination complies with at least 85%, for 12-volt filament lamps, and at least 77%, for 6-volt and 24-volt filament lamps, with the minimum values of the light-distribution requirements laid down for the passing beam in the relevant Regulation. The maximum illumination limits remain unchanged.

In the case of a filament lamp having a selective-yellow bulb this test shall be left out if the approval is also given to the same type of filament lamp emitting white light.

3.8.5. A headlamp shall be deemed to be a standard headlamp if:

3.8.5.1. it satisfies the pertinent conditions of approval;

3.8.5.2. it has an effective diameter of not less than 160 mm;

3.8.5.3. with a standard filament lamp it produces at the various points and in the various zones specified for the headlamp type concerned, illumination equal to:

3.8.5.3.1. not more than 90% of the maximum limits and

3.8.5.3.2. not less than 120% of the minimum limits prescribed for the headlamp type concerned.

3.9. Standard filament lamps

Standard filament lamps for photometric tests of headlamps and light-signalling appliances are specified on the relevant data sheets of annex 1. Standard filament lamps shall have colourless bulbs (except for amber filament lamps) and be specified for only one rated voltage.

4. CONFORMITY OF PRODUCTION

4.1. Filament lamps approved to this Regulation shall be so manufactured as to conform to the type approved by meeting the inscriptions and technical requirements set forth in paragraph 3 above and annexes 1, 3 and 4 to this Regulation.

4.2. In order to verify that the requirements of paragraph 4.1. are met, suitable controls of the production shall be carried out.

4.3. The holder of the approval shall in particular:

4.3.1. ensure existence of procedures for the effective control of the quality of products,

4.3.2. have access to the control equipment necessary for checking the conformity to each approved type,

4.3.3. ensure that data of test results are recorded and that related documents shall remain available for a period to be determined in accordance with the administrative service,

4.3.4. analyse the results of each type of test, applying criteria of annex 7, in order to verify and ensure the stability of the product characteristics making allowance for variation of an industrial production,

4.3.5. ensure that for each type of filament lamp, at least the tests prescribed in annex 6 to this Regulation are carried out,

4.3.6. ensure that any collecting of samples giving evidence of non-conformity with the type of test considered shall give rise to another sampling and another test. All the necessary steps shall be taken to re-establish the conformity of the corresponding production.

4.4. The competent authority which has granted type-approval may at any time verify the conformity control methods applicable to each production unit.

4.4.1. In every inspection, the test books and production survey records shall be presented to the visiting inspector.

4.4.2. The inspector may take samples at random which will be tested in the manufacturer's laboratory. The minimum number of samples may be determined according to the results of the manufacturer's own verification.

4.4.3. When the quality level appears unsatisfactory or when it seems necessary to verify the validity of the tests carried out in application of paragraph 4.4.2. above, the inspector shall select samples, to be sent to the technical service which has conducted the type approval tests.

4.4.4. The competent authority may carry out any tests prescribed in this Regulation. Where the competent authority decides to carry out spot checks, criteria of annexes 8 and 9 to this Regulation shall be applied.

4.4.5. The normal frequency of inspections authorized by the competent authority shall be one every two years. In the case where negative results are recorded during one of these visits, the competent authority shall ensure that all necessary steps are taken to re-establish the conformity of production as rapidly as possible.

5. PENALTIES FOR NON-CONFORMITY OF PRODUCTION

5.1. The approval granted in respect of a type of filament lamp pursuant to this Regulation may be withdrawn if the requirements are not met or if a filament lamp bearing the approval mark does not conform to the type approved.

5.2. If a Contracting Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by means of a communication form conforming to the model in annex 2 to this Regulation.

6. PRODUCTION DEFINITELY DISCONTINUED

If the holder of the approval completely ceases to manufacture a type of filament lamp approved in accordance with this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication, that authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in annex 2 to this Regulation.

7. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS, AND OF ADMINISTRATIVE DEPARTMENTS

The Parties to the 1958 Agreement which apply this Regulation shall communicate to the United Nations Secretariat the names and addresses of the technical services responsible for conducting approval tests and of the administrative departments which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, or production definitely discontinued issued in other countries, are to be sent.

8. TRANSITIONAL PROVISIONS

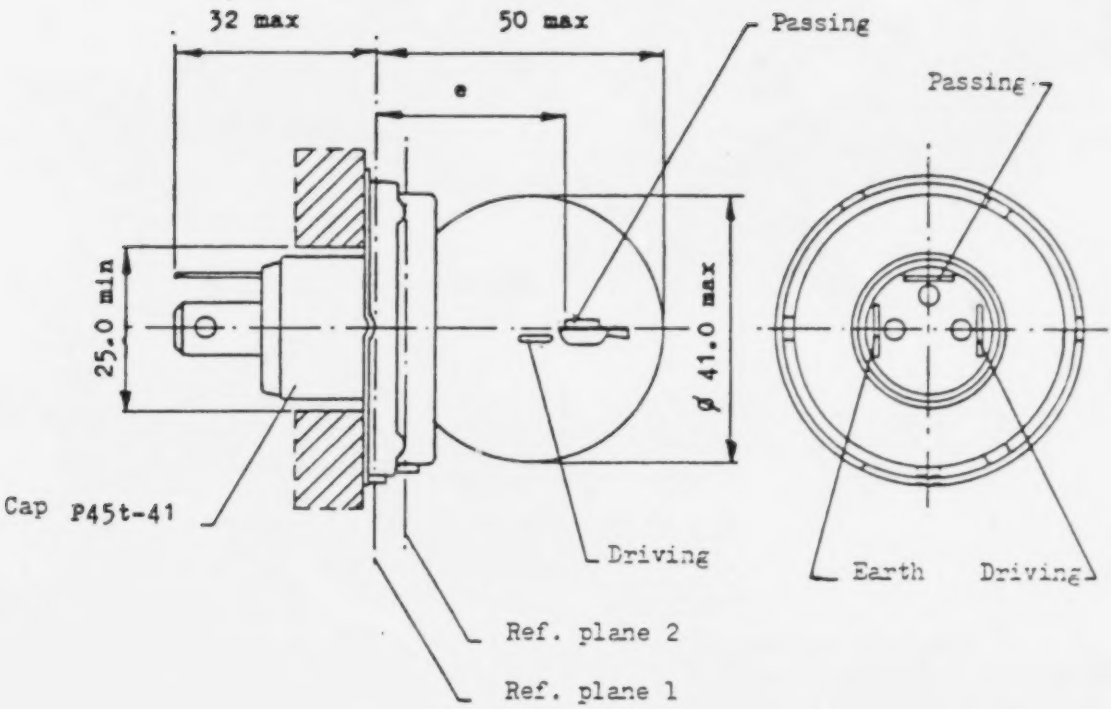
8.1. Approvals granted under the preceding series of amendments shall remain valid.

8.2. The correspondence between the former designations and the new ones is indicated in the following table:

Old Designations	New designations in the 03 series of amendments
P25-1	P21W
P25-2	P21/5W
R19/5	R5W
R19/10	R10W
C11	C5W
C15	C21W
T8/4	T4W
W10/5	W5W
W10/3	W3W

Annex 1

CATEGORY R2 Sheet R2/1



1. Only the over-all dimensions and the dimensions affecting interchangeability are shown in the drawing and are mandatory.

2. The reference axis is the perpendicular to reference plane 1 and passes through the intersection of this plane with the axis of the corresponding centering cylinder.

3. The internal structure of the filament lamp and the corresponding dimensions, are given in the drawings on sheets R2/2 and R2/3.

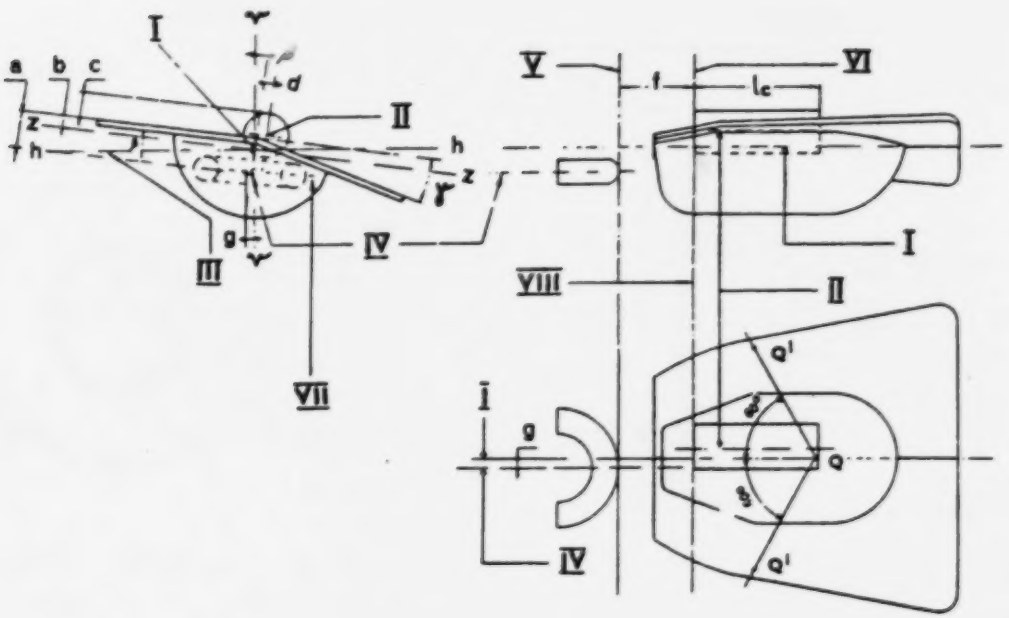
4. No part of the cap shall, by reflection of light emitted by the passing-beam filament, throw any stray rising ray when the lamp is in normal operating position on the vehicle.

5. The bulb shall be colourless or selective-yellow.

CATEGORY R2

Sheet R2/2

R2 filament lamp: internal elements



Key

I. Reference axis
II. Axis of passing-beam filament
III. Plane passing through the reference axis of the filament lamp and perpendicular to the median plane of the positioning lug of reference plane 1
IV. Axis of driving-beam filament
V. Apex of driving-beam filament
VI. First bright turn of passing-beam filament
VII. The plane passing through the axis of the driving-beam filament need not be parallel either to the plane h-h or to the plane z-z
VIII. Distance e from reference plane

Note: The drawing is not mandatory with respect to the design of the shield and filaments.

CATEGORY R2 Sheet R2/3

R2 filament lamp: internal elements

Dimensions in mm or degrees 4/		Tolerances in mm or degrees	
		Filament lamp of normal production	Standard filament lamp
a	0.6	± 0.35	± 0.15
b	0.2	± 0.35	± 0.15
c	0.5	± 0.30	± 0.15
d	0	± 0.5	± 0.3
e	28.5 1/	± 0.35	± 0.15
f	1.8 2/	± 0.4	± 0.2
g	0	± 0.5	± 0.3
l_c	5.5	± 1.5	± 0.5
β	0°	± 1°30'	± 0°30'
γ	15°	± 1°30'	± 0°30'
Q-Q' 3/	3/4 (l_c + f)		

1/ 28.8 for 24-volt filament lamps

2/ 2.2 for 24-volt filament lamps

3/ The value established for Q-Q' apples solely to the standard filament lamp used for the approval testing of a headlamp; the dimensions of the shield must be such that the points Q' are situated inward from the edge of the shield

4/ For the method of measurement, see Appendix D of IEC Publication No. 809

Sheet R2/4

CATEGORY R2

Table of electrical and photometric characteristics

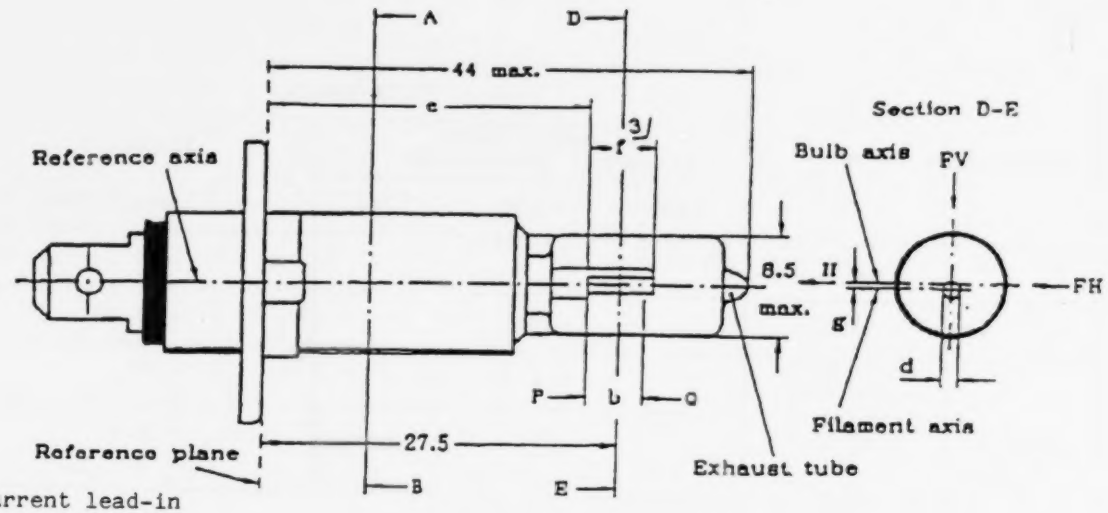
		Filament lamp of normal production 1/						Standard filament lamp 1/	
Rated values	Volts	6		12		24		12	
	Watts	45	40	45	40	55	50	45	40
Test voltage	Volts	6.3		13.2		28.0			
Objective 2/	Watts	45	40	45	40	55	50	45 at 12 V	40 at 12 V
	Tolerance %	+ 10						+ 0 - 10	± 5
	luminous flux lm	600 min.	400 min. 550 max.	600 min.	400 min. 550 max.	600 min.	400 min. 550 max.		
Measuring luminous flux for measurements, according to paragraph 3.8. of this Regulation lm		-	450	-	450	-	450		
Reference luminous flux at approximately 12 V lm								700	450
Cap P45t-41 in accordance with IEC Publication 61 (sheet 7004-95-2) 3/									

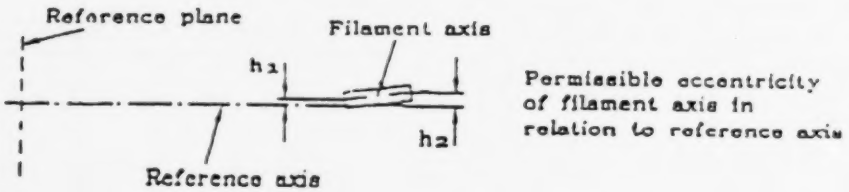
1/ The values indicated on the left and on the right refer to the driving-beam and the passing-beam filaments respectively.

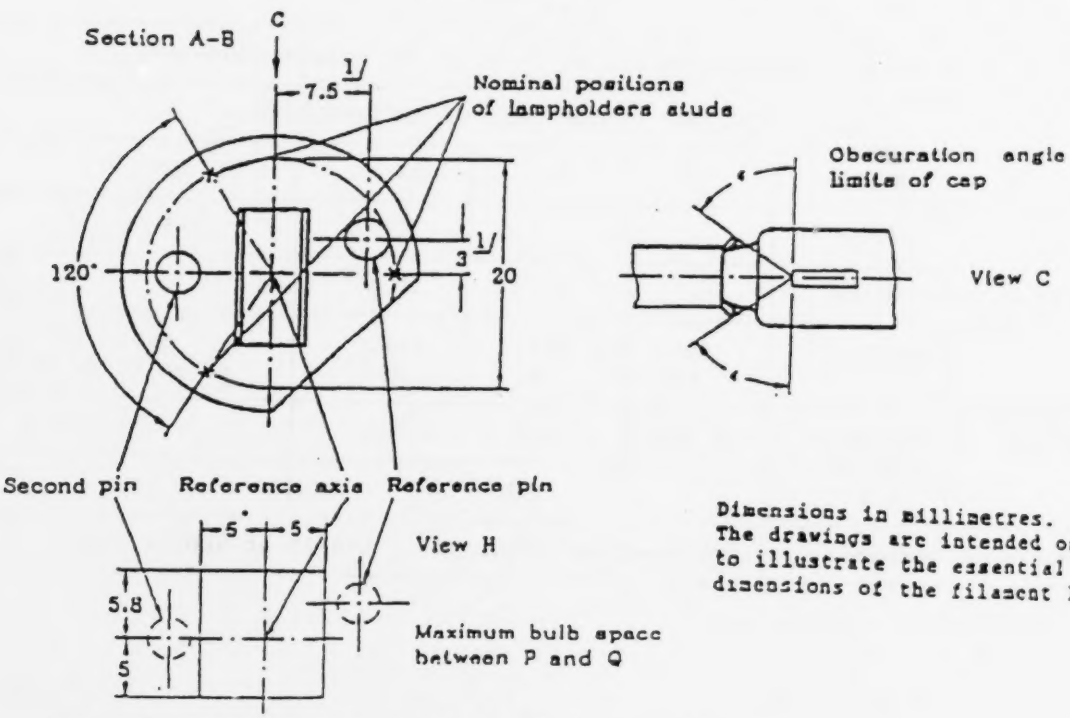
2/ By derogation from paragraph 3.1.3. of this Regulation, the objective values are to be measured at rated voltage.

3/ The "window" mentioned in that sheet is no longer required. The value X shall be 1.3 min/1.7 max.

CATEGORY H1 Sheet H1/1







Dimensions in millimetres.
The drawings are intended only to illustrate the essential dimensions of the filament lamp.

The bulb shall be colourless or selective-yellow.

CATEGORY H1 Sheet H1/2

Dimensions in mm			Tolerances			
			Filament lamps of normal production			Standard
			6V	12V	24V	filament lamp
b	0.7 f					
e 5/ 9/	25.0			8/		± 0.15
f 5/ 9/	6V	4.5		± 1.0		
	12V	5.0		± 0.5		+ 0.5 0
	24V	5.5		± 1.0		
g 6/	0.5 d 7/			± 0.5 d		± 0.25 d
h1	0			8/		± 0.20 4/
h2				8/		± 0.25 4/
∈	45°			± 12°		± 3°
Cap P 14,5s in accordance with IEC Publication 61 (sheet 7004-46-1)						
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS						
Rated values	Volts		6	12	24	12
	Watts		55		70	55
Test voltage Volts			6.3	13.2	28.0	
Objective values	Watts		max. 63	max. 68	max. 84	max. 68 at 13.2V
	Luminous flux lm		1 350	1 550	1 900	
	± %		15			
Reference luminous flux for headlamp testing: 1 150 lm at approx. 12V.						

1/ The reference axis is the perpendicular to the reference plane and passing through the point defined by the dimensions marked with 1/.

2/ Both current lead-in electrodes shall be positioned in the bulb, the longer electrode above the filament (the lamp being viewed as shown in the figure). The internal design of the lamp should then be such that stray light images and reflections are reduced to the minimum, e.g. by fitting cooling jackets over the non-coiled parts of the filament.

3/ The cylindrical portion of the bulb over length 'f' shall be such as not to deform the projected image of the filament to such an extent as appreciably to affect the optical results.

4/ The eccentricity is measured only in the horizontal and vertical directions of the filament lamp as shown in the figure. The points to be measured are those where the projection of the outside of the end turns nearest to or furthest from the reference plane crosses the filament axis.

5/ The viewing direction is the perpendicular to the reference axis contained in the plane defined by the reference axis and the centre of the second pin of the cap.

6/ Offset of filament in relation to bulb axis measured at 27.5 mm from the reference plane.

7/ d: diameter of filament.

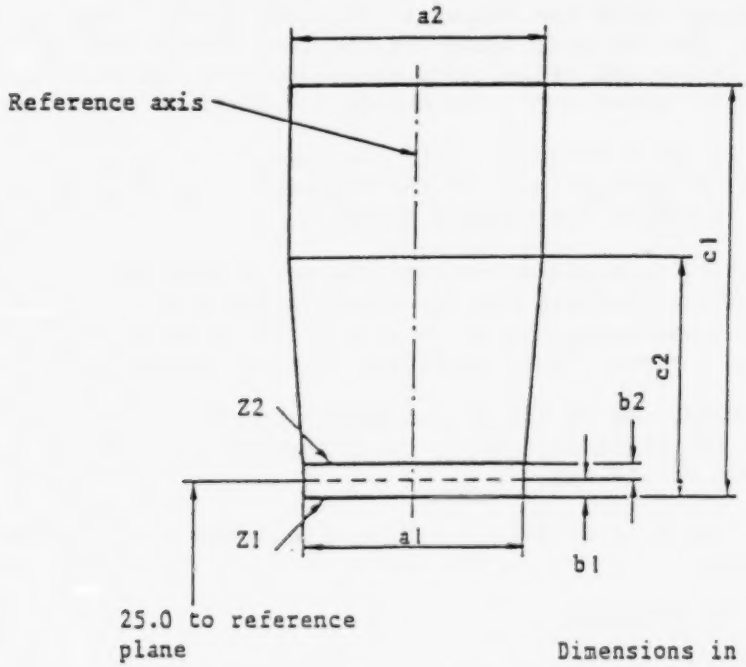
8/ To be checked by means of a 'box-system', sheet H1/4.

9/ The ends of the filament are defined as the points where, when the viewing direction is as defined in footnote 5 above, the projection of the outside of the end turns nearest to or furthest from the reference plane crosses the reference axis (special instructions for coiled-coil filaments are under consideration).

CATEGORY H1 Sheet H1/4

Screen projection requirements

This test is used to determine, by checking whether the filament is correctly positioned relatively to the reference axis and the reference plane, whether a filament lamp complies with the requirements.



Dimensions in millimetres

	a1	a2	b1	b2	c1	c2
6V	1.4 d	1.9 d	0.25		6	3.5
12V					6	4.5
24V					7	4.5

d = diameter of filament

The beginning of the filament as defined on sheet H1/3, footnote 9/, must lie between lines Z1 and Z2.

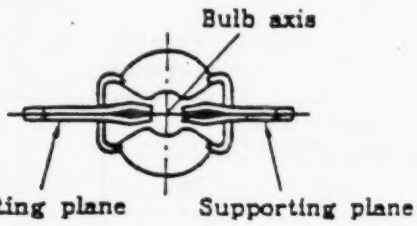
The filament position is checked solely in directions FH and FV as shown on sheet H1/1.

The filament must lie entirely within the limits shown.

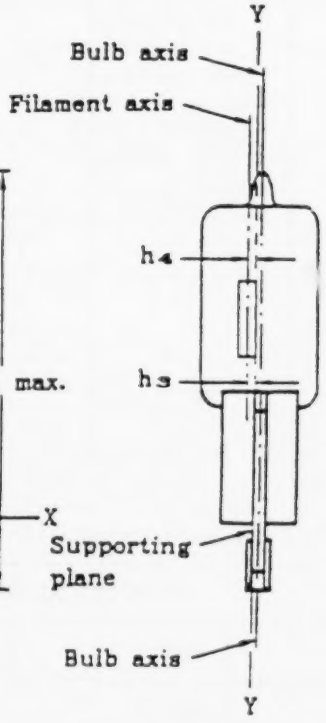
CATEGORY H2 Sheet H2/1

Dimensions in millimetres
The drawings are intended only to illustrate the essential dimensions of the filament lamp

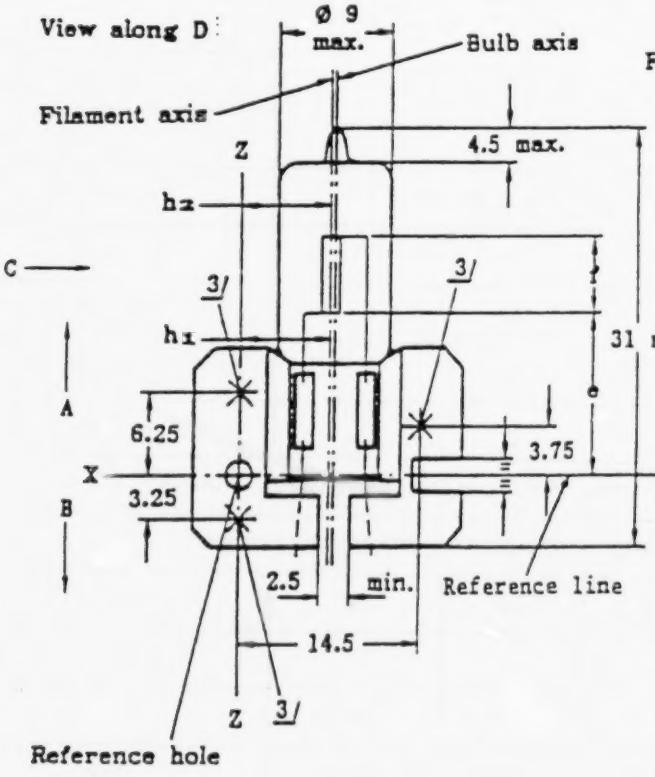
View along A



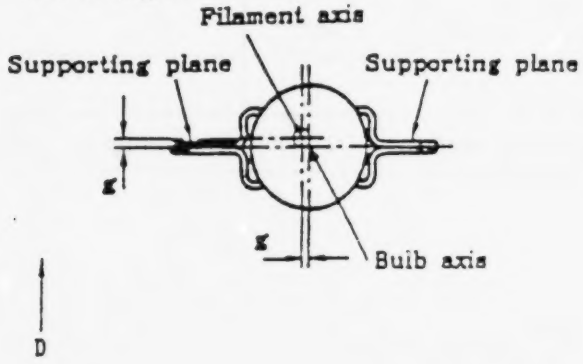
View along C



View along D



View along B



The bulb shall be colourless or selective-yellow.

CATEGORY H2 Sheet H2/2

Dimensions in mm			Tolerances			
			Filament lamp of normal production			Standard filament lamp
			6V	12V	24V	
e 6/	12.25		5/			± 0.15
f 6/	6V	4.5	± 1.0			
	12V	5.5				± 0.50
	24V					
g 1/ 2/	0.5 d		± 0.5 d			± 0.25 d
h1 2/	7.1		5/			± 0.20
h2 4/			5/			± 0.25
h3 1/ 2/	0.5 d		5/			± 0.20
h4 1/ 4/			5/			± 0.25
Cap X 511 in accordance with IEC Publication 61 (sheet 7004-99-2)						
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS						
Rated values	Volts		6	12	24	12
	Watts		55		70	55
Test voltage	Volts		6.3	13.2	28.0	
Objective values	Watts		max. 63	max. 68	max. 84	max. 68 at 13.2V
	Luminous flux lm		1 300	1 800	2 150	
	± %		15			
Reference luminous flux for headlamp testing: 1 300 lm at approx. 12V.						

CATEGORY H2 Sheet H2/3

1/ d: diameter of filament.

2/ These offsets should be measured in a cross-section perpendicular to the axis of the bulb and passing through that end of the filament */ which is nearer to the cap.

3/ The three crosses on the supporting plane show the positions of the three bosses defining this plane on the holder. Within a circle 3 mm in diameter centred on these points there should be no apparent deformation and no notches affecting the positioning of the filament lamp.

4/ These offsets should be measured in a cross-section perpendicular to the axis of the bulb and passing through that end of the filament */ which is further from the cap.

5/ To be checked by means of a "box system", sheet H2/4.

6/ The ends of the filament are defined as the points where, when the viewing direction is as defined by "D" (sheet H2/1), the projection of the outside of the end turns nearest to or furthest from the cap crosses a line parallel to and at a distance of 7.1 mm from line ZZ (special instructions for coiled-coil filaments are under consideration).

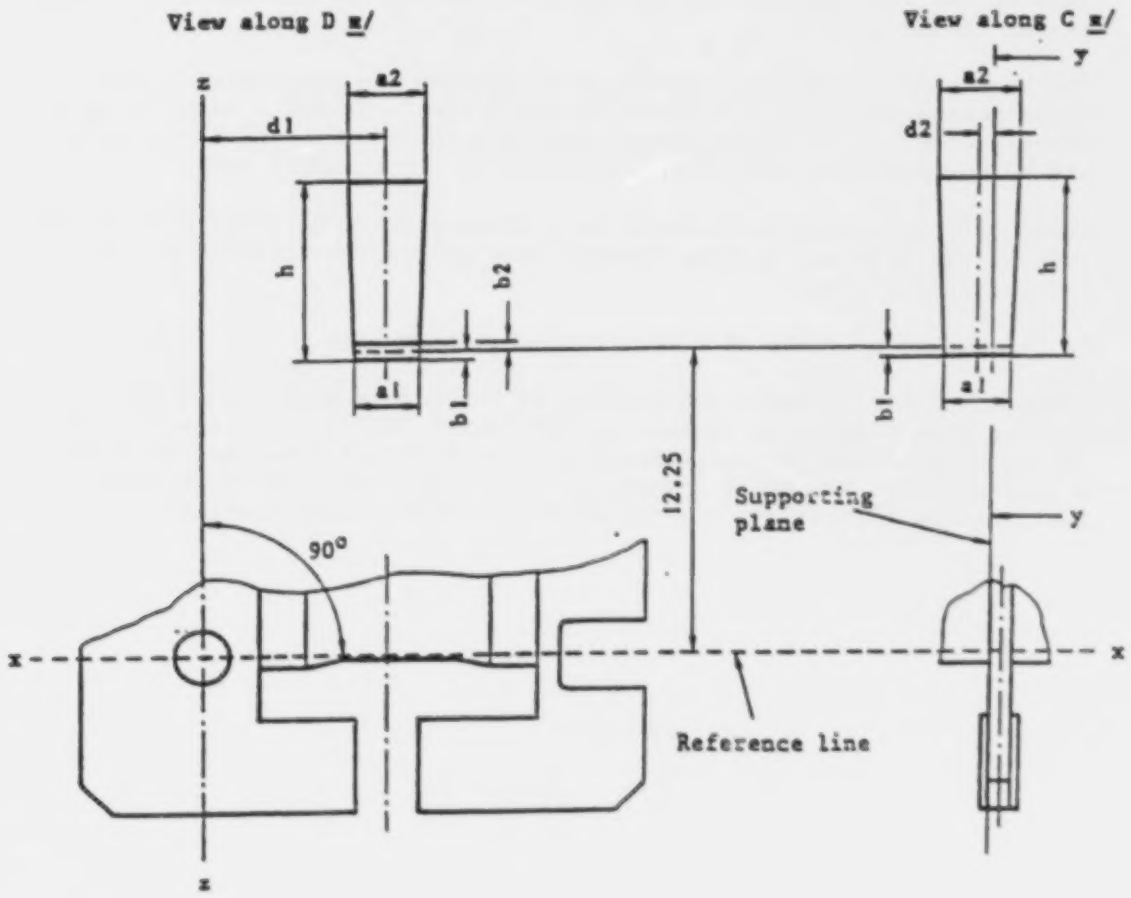
---

*/ The points to be measured are those where the outside of the end turn that is nearest to or furthest from the cap crosses the filament axis.

CATEGORY H2 Sheet H2/4

Screen projection requirements

This test is used to determine, by checking whether a filament is correctly positioned relatively to the axes x-x, y-y and z-z x/, whether a filament lamp complies with the requirements.



	6V	12V	24V
a1	d + 0.50		d + 1.0
a2	d + 1.0		
b1, b2	0.25		
d1	7.1		
d2	0.5d - 0.35		
h	6	7	

d = diameter of filament

The end of the filament xx/ which is nearer to the cap must lie between b1 and b2.
The filament must lie entirely within the limits shown.

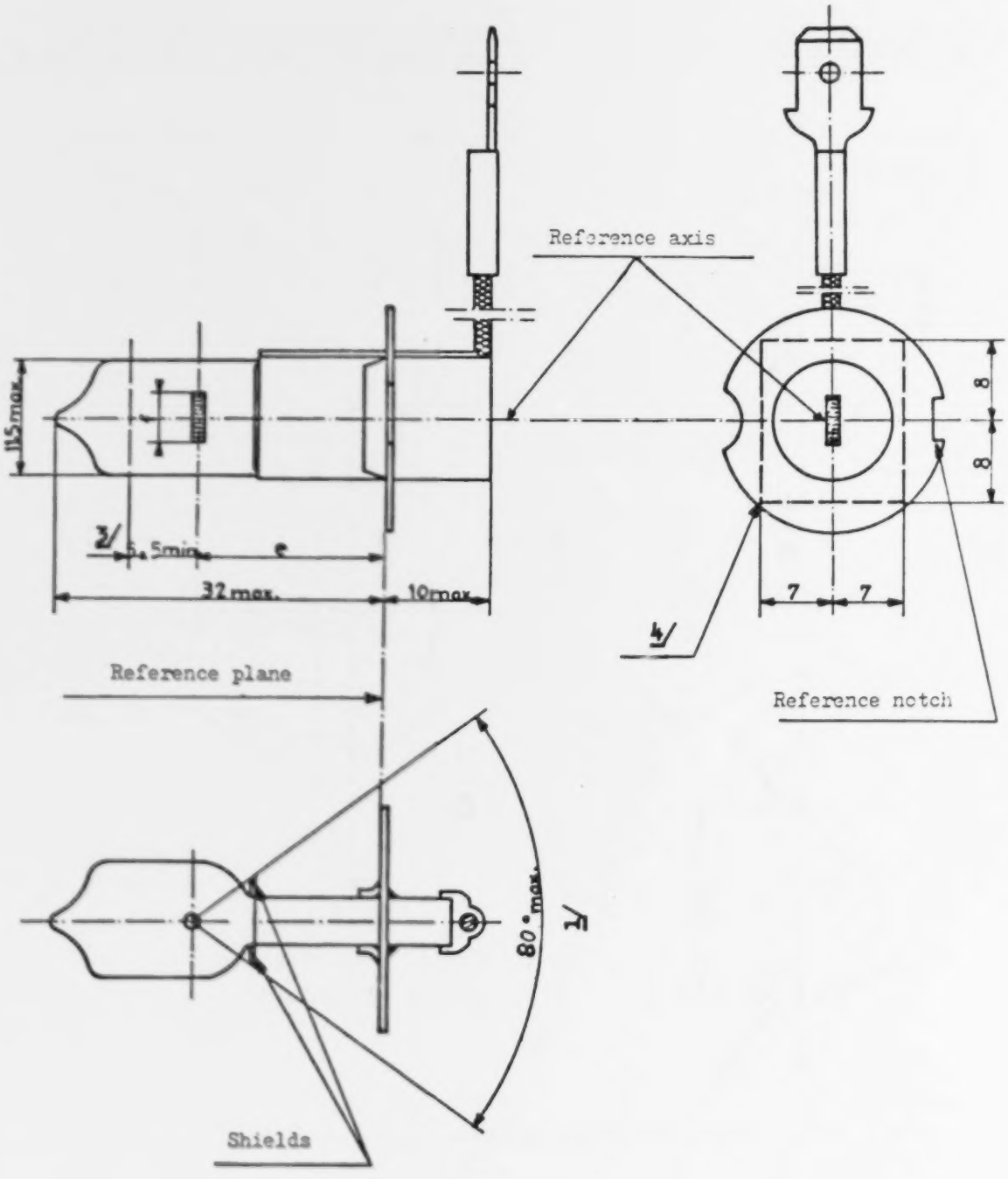
x/ See sheet H2/1.
xx/ The end of the filament is defined at sheet H2/3.

Dimensions in millimetres.

CATEGORY H3

Sheet H3/1

Dimensions in millimetres

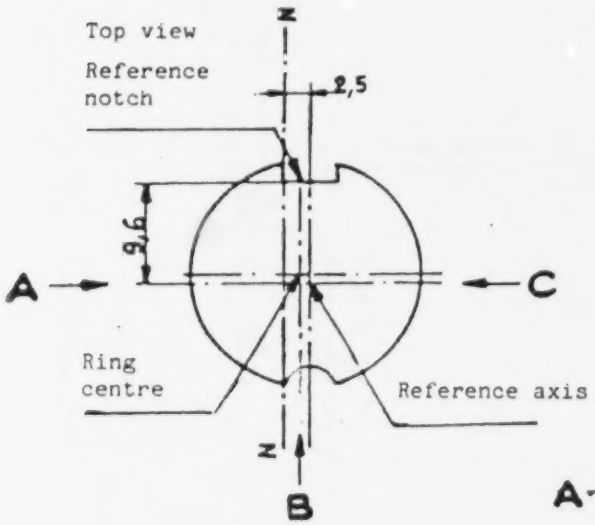


The bulb shall be colourless or selective-yellow.

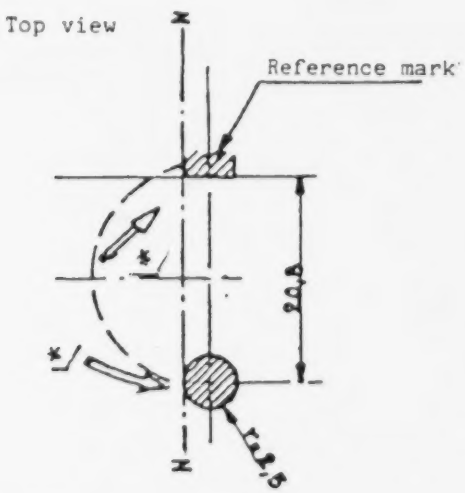
CATEGORY H3 Sheet H3/2

Dimensions in millimetres

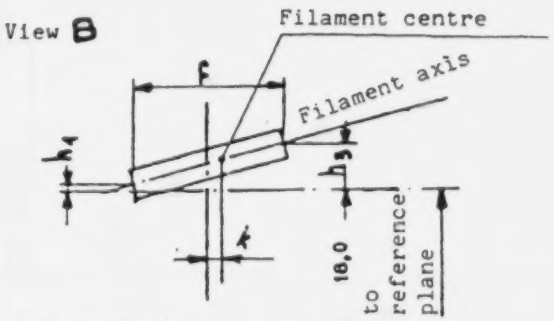
Definition: Ring centre and reference axis 2/

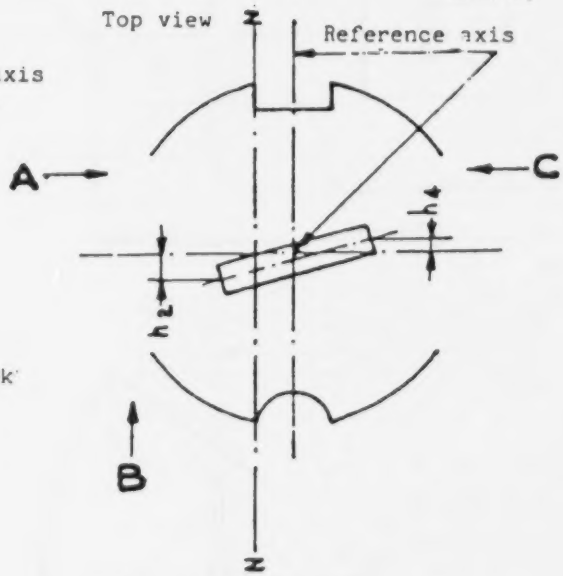


Definition of Z - Z line



Filament dimensions and tolerances for standard filament lamps, see sheet H3/3





View A: measuring h_2

View B: measuring k, h_1, h_3, f

View C: measuring h_4

*/ The cap should be pressed in these directions.

Sheet H3/3

CATEGORY H3

DIMENSIONS in mm			Filament lamps of normal production			Standard filament lamp
			6V	12V	24V	
e			18.0 5/			18.0
f 7/			3.0 min	4.0 min		5.0 ± 0.50
k			5/			0 ± 0.20
h1						0 ± 0.15 6/
h3						
h2						0 ± 0.25 6/
h4						
Cap PK 22s in accordance with IEC Publication 61 (sheet 7004-47-2)						
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS						
Rated values		Volts	6	12	24	12
		Watts	55		70	55
Test voltage		Volts	6.3	13.2	28.0	
Objective values		Watts	max 63	max 68	max 84	max 68 at 13.2 V
	Luminous flux	lm	1 050	1 450	1 750	
		±%	15			
Reference luminous flux for headlamp testing : 1 100 lm at approx. 12V						

CATEGORY H3 Sheet H3/4

1/ The distortion of the base-end portion of the bulb must not be visible from any direction outside the obscuration angle of 80° max. The shields must produce no inconvenient reflections. The angle between the reference axis and the plane of each shield, measured on the bulb side, should not exceed 90°.

2/ The permissible deviation of the ring centre from the reference axis is 0.5 mm in the direction perpendicular to the Z-Z line and 0.05 mm in the direction parallel to the Z-Z line.

3/ Minimum length above the height of the light-emitting centre ("c") over which the bulb must be cylindrical.

4/ No part of the spring and no component of the lamp-holder shall bear on the prefocus ring elsewhere than outside the rectangle shown in discontinuous outline.

5/ These dimensions of lamps of normal production should be checked by means of a "box system" sheet H3/5.

6/ For standard filament lamps the points to be measured are those where the projection of the outside of the end turns crosses the filament axis.

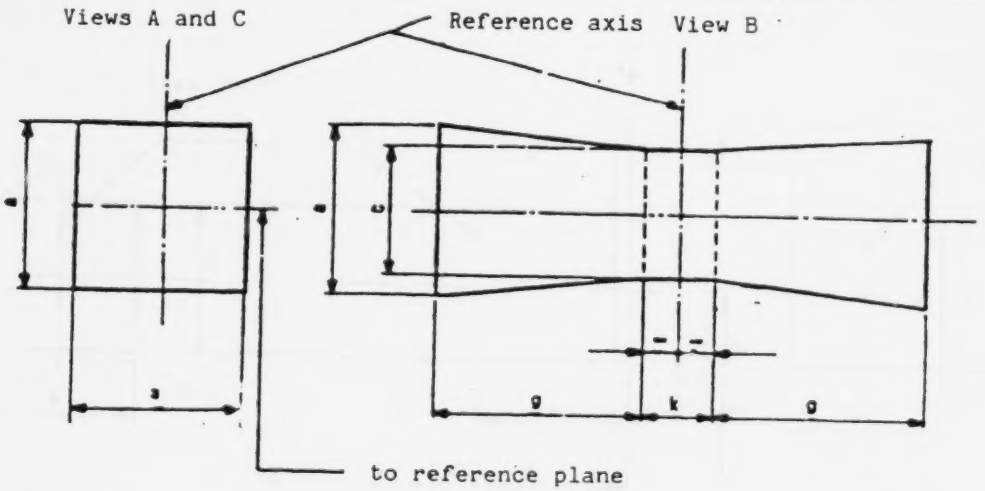
7/ The positions of the first and the last turn of the filament are defined by the intersections of the outside of the first and the outside of the last light-emitting turn, respectively, with the plane parallel to and 13 mm distant from the reference plane (additional instructions for coiled-coil filaments are under consideration).

CATEGORY H3 Sheet H3/5

Screen Projection Requirements

This test is used to determine, by checking whether the filament is correctly positioned relatively to the reference axis and the reference plane, whether a filament lamp complies with the requirements.

dimensions in millimetres



	a	c	k	g
6 V	1.8d	1.6d	1.0	2.0
12 V				2.8
24 V				2.9

d = diameter of the filament

The filament shall lie entirely within the limits shown.

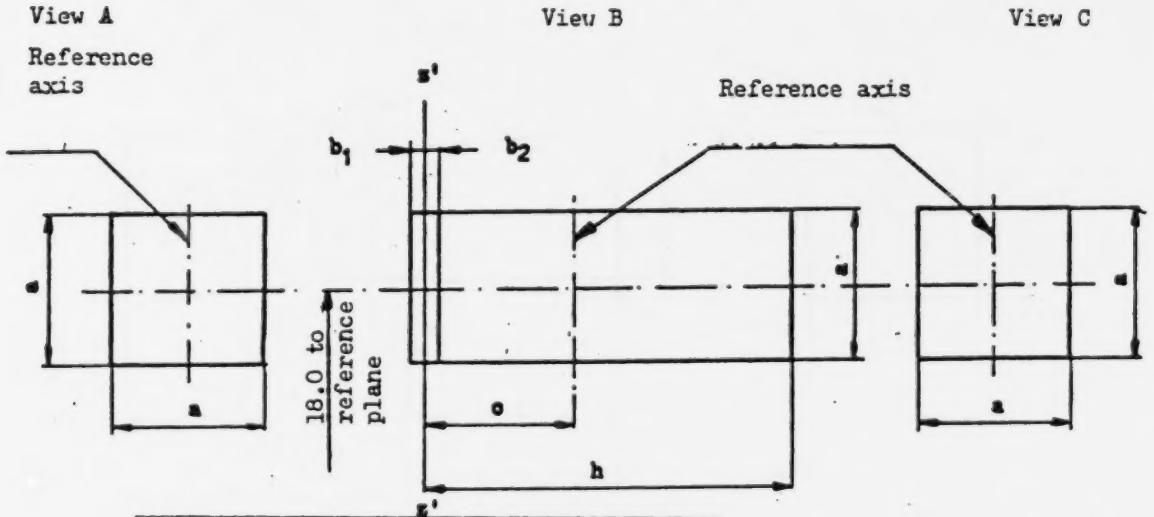
The centre of the filament shall lie within the limits of dimension K

CATEGORY H3 Sheet H3/6

Screen Projection Requirements

This test is used to determine, by checking whether the filament is correctly positioned relatively to the reference axis and the reference plane, whether a filament lamp complies with the requirements.

dimensions in millimetres



	a	b1	b2	c	h
6V	1.8d	0.25		2.0	4.6
12V	1.8d			2.5	6.0
24V	1.8d				6.2

d= diameter of filament

The first turn of the filament must lie entirely within the limits shown in view "A". The transverse projection of the filament must lie within the limits shown in view "B"; z'-z' is a plane perpendicular to the reference plane, parallel to and on the same side as the z-z line and at a distance "c" from the reference axis. The beginning of the filament as defined will be between b_1 and b_2. The last turn of the filament */ will be within the limits shown in view "C".

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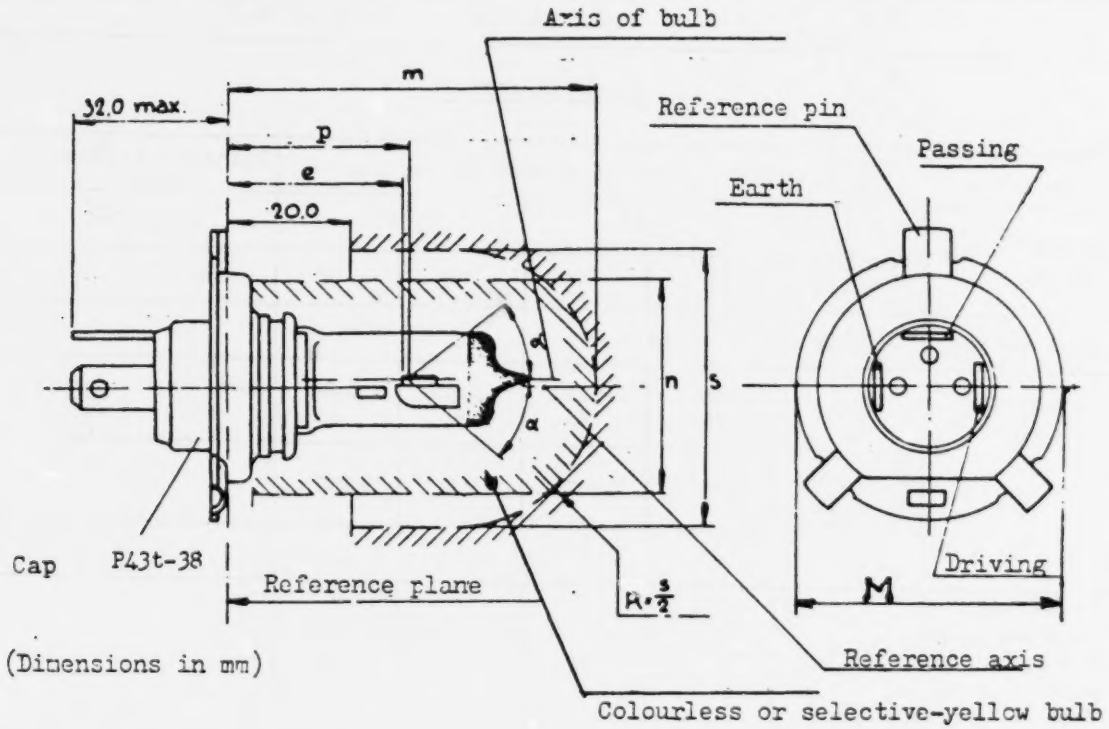
*/ as defined on sheet H3/4, foot-note 7.

CATEGORY H4

Sheet H4/1



(Dimensions in mm)

The drawings are not mandatory; their sole purpose is to show which dimensions must be verified.

Reference	Dimension		Tolerance	
	12 V	24 V	12 V	24 V
e	28.5	29.0	+ 0.45 - 0.25	± 0.35
p	28.95	29.25	-	-
m [1]	max. 60.0		-	
n [1]	max. 34.5		-	
s [2]	45.0		-	
α [3]	max. 40°		-	

CATEGORY H4 Sheet H4/2

Characteristics

		Filament lamps of normal production				Standard filament lamp	
Rated values	Volts	12 [4]		24 [4]		12 [4]	
	Watts	60	55	75	70	60	55
Test voltage	Volts	13.2		28			
Objective values	Watts	max. 75	max. 68	max. 85	max. 80	max. 75 at 13.2V	max. 68 at 13.2V
	Luminous flux lm	1650	1000	1900	1200		
	±%	15					
Measuring luminous flux according to para. 3.8 of this Regulation	lm		750		800		
Reference luminous flux at approximately 12 V lm						1250	750
Cap P43t-38 in accordance with IEC Publication 61 (sheet 7004-39-2)							

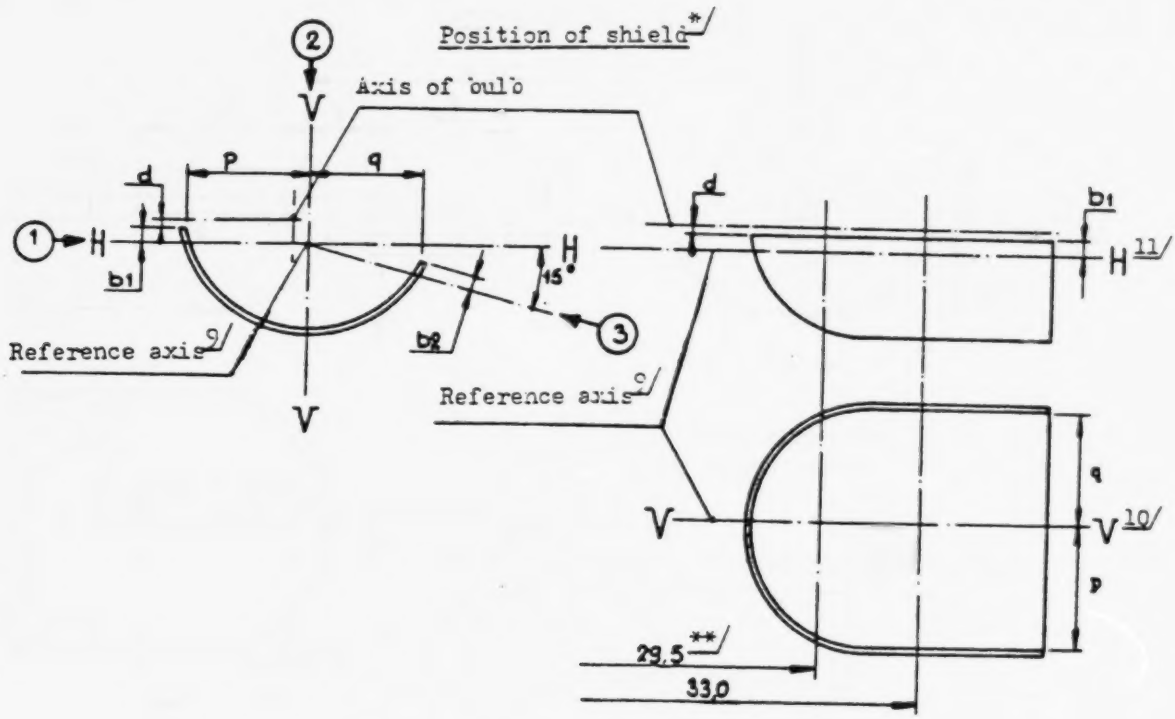
1/ Where a yellow outer bulb is used, "m" and "n" denote the maximum dimensions of this bulb; where there is no outer bulb, "m" denotes the maximum length of the lamp.

2/ It must be possible to insert the lamp into a cylinder of diameter "s" concentric with the reference axis and limited at one end by a plane parallel to and 20 mm distant from the reference plane and at the other end by a hemisphere of radius $\frac{s}{2}$.

3/ The obscuration must extend at least as far as the cylindrical part of the bulb. It must also overlap the internal shield when the latter is viewed in a direction perpendicular to the reference axis. The effect sought by obscuration may also be achieved by other means.

4/ The values indicated in the left-hand column relate to the driving beam. Those indicated in the right-hand column relate to the passing beam.

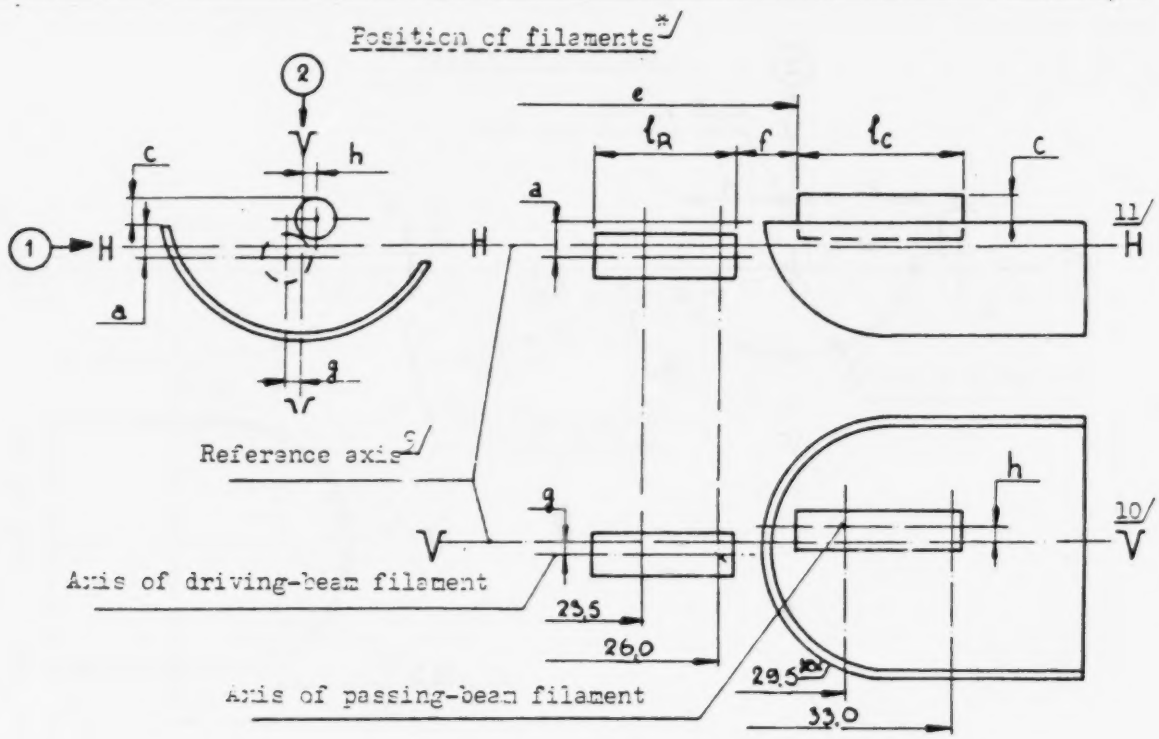
CATEGORY H4 Sheet H4/3



*/ The drawing is not mandatory with respect to the design of the shield.

**/ 30.0 for the 24-volt type.

CATEGORY H4 Sheet H4/4



Dimensions in millimetres

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*/ The drawing is not mandatory with respect to the design of the shield.

**/ For 24-V lamps : 30.0 mm.

CATEGORY H4 Sheet H4/5

Additional explanations to sheets H4/3 and H4/4

The dimensions below are measured in three directions:

(1) for dimensions a, b_1, c, d, e, f, l_R and l_C;

(2) for dimensions g, h, p and q;

(3) for dimensions b_2.

Dimensions p and q are measured in a plane parallel to and 33 mm away from the reference plane.

Dimensions b_1, b_2, c and h are measured in planes parallel to and 29.5 mm (30.0 mm for 24-V lamps) and 33 mm away from the reference plane.

Dimensions a and g are measured in planes parallel to and 26.0 mm and 23.5 mm away from the reference plane.

Note: For the method of measurement, see Appendix E of IEC Publication 809.

CATEGORY H4 Sheet H4/6

Table of the dimensions referred to in the diagrams on sheets H4/3 and H4/4 (in mm)

Reference		Dimension		Tolerances		
				Filament lamps of normal production		Standard filament lamp
12 V	24 V	12 V	24 V	12 V	24 V	12 V
a/26 */		0.8		± 0.35		± 0.2
a/23.5 */		0.8		± 0.60		± 0.2
b1/29.5 */	30.0 */	0		± 0.30	± 0.35	± 0.2
b1/33 */		b1/29.5mv **/	30.0mv **/	± 0.30	± 0.35	± 0.15
b2/29.5 */	30.0 */	0		± 0.30	± 0.35	± 0.2
b2/33 */		b2/29.5mv **/	30.0mv **/	± 0.30	± 0.35	± 0.15
c/29.5 */	30.0 */	0.6	0.75	± 0.35		± 0.2
c/33 */		c/29.5mv **/	30.0mv **/	± 0.35		± 0.15
d		min 0.1		-		-
e 7/		28.5	29.0	+ 0.35 - 0.25	± 0.35	+ 0.2 - 0.0
f 5/ 6/ 8/		1.7	2.0	+ 0.50 - 0.30	± 0.40	+ 0.3 - 0.1
g/26 */		0		± 0.5		± 0.3
g/23.5 */		0		± 0.7		± 0.3
h/29.5 */	30.0 */	0		± 0.5		± 0.3
h/33 */		h/29.5mv **/	30.0mv **/	± 0.35		± 0.2
l_a 5/ 8/		4.5	5.25	± 0.8		± 0.4
l_c 5/ 6/		5.5	5.25	± 0.5	± 0.8	± 0.35
p/33 */		Depends on the shape of the shield		-		-
q/33 */		$\frac{p + q}{2}$		± 0.6		± 0.3

*/ Dimension to be measured at the distance from the reference plane indicated in mm after the stroke.

**/ "29.5mv" or "30.0mv" means the value measured at a distance of 29.5 mm or 30.0 mm from the reference plane.

CATEGORY H4 Sheet H4/7

5/ The end turns of the filaments are defined as being the first luminous turn and the last luminous turn that are at substantially the correct helix angle. For coiled-coil filaments, the turns are defined by the envelope of the primary coil.

6/ For the passing-beam filament the points to be measured are the intersections, seen in direction (1), of the lateral edge of the shield with the outside of the end turns defined under foot-note 5.

7/ "e" denotes the distance from the reference plane to the beginning of the passing-beam filament as defined above.

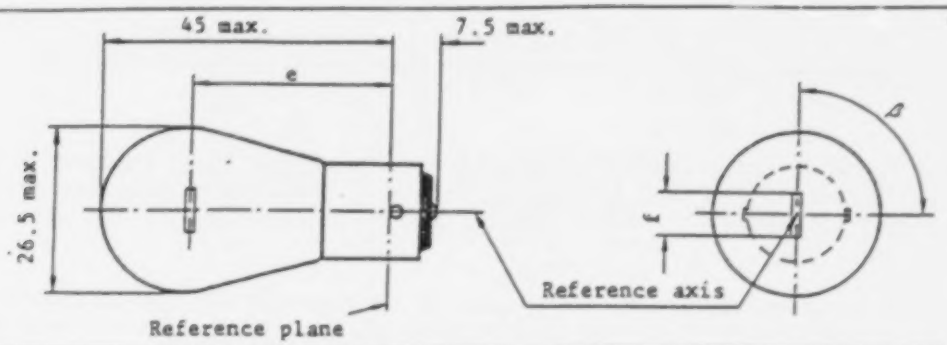
8/ For the driving-beam filament the points to be measured are the intersections, seen in direction (1), of a plane, parallel to plane HH and situated at a distance of 0.8 mm below it, with the end turns defined under foot-note 5.

9/ The reference axis is the line perpendicular to the reference plane and passing through the centre of the circle of diameter "M" (see sheet H4/1).

10/ Plane VV is the plane perpendicular to the reference plane and passing through the reference axis and through the intersection of the circle of diameter "M" with the axis of the reference pin.

11/ Plane HH is the plane perpendicular to both the reference plane and plane VV and passing through the reference axis.

CATEGORY P21W Sheet P21W/1



Dimensions in mm		Filament lamps of normal production			Standard filament lamp
		min.	nom.	max.	
e			31.8 1/		31.8 ± 0.3
f	12 V	5.5	6.0	7.0	6.0 ± 0.5
	6, 24 V 4/			7.0	
β		75°	90°	105°	90° ± 5°
Lateral deviation 1/				3/	0.3 max.
Cap BA 15s in accordance with IEC Publication 61 (sheet 7004-11A-7) 2/					
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS					
Rated values	Volts	6	12	24	12
	Watts	21			21
Test voltage	Volts	6.75	13.5	28.0	
Objective values	Watts	26	25	28	25 at 13.5V
	± %	6			6
	Luminous flux lm	460			
	± %	15			
Reference luminous flux : 460 lm at approximately 13.5V					

1/ Maximum lateral deviation of filament centre from two reciprocally perpendicular planes both containing the reference axis of cap and one containing axis of pins.

2/ Lamps with cap BA 15 d may be used for special purposes; they have the same dimensions.

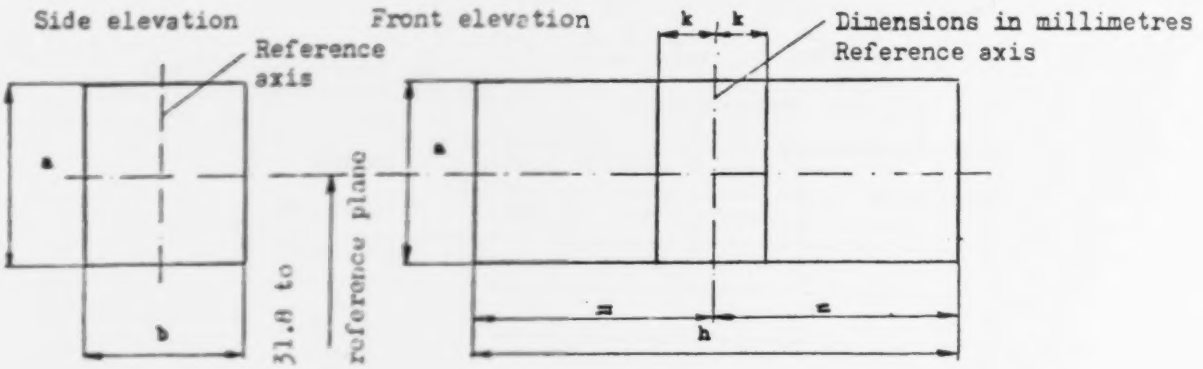
3/ To be checked by means of a "box system", sheet P21W/2.

4/ For 24-volt heavy-duty lamps having a different filament shape, additional specifications are under consideration.

CATEGORY P21W Sheet P21W/2

Screen projection requirements

This test is used to determine, by checking whether the filament is correctly positioned relatively to the reference axis and the reference plane and has an axis perpendicular, within ± 15°, to the plane through the centres of the pins and the reference axis, whether a filament lamp complies with the requirements.



reference	a	b	h	k
dimension	3.5	3.0	9.0	1.0

Test procedure and requirements.

1. The lamp is placed in a holder (socket) capable of being rotated about its axis and having either a calibrated scale or fixed stops corresponding to the angular-displacement tolerance limits, i.e. ± 15°. The holder is then so rotated that an end view of the filament is seen on the screen on to which the image of the filament is projected. The end view of the filament should be obtained within the angular-displacement tolerance limits (± 15°).

2. Side elevation
The lamp being placed with the cap down, the reference axis vertical, and the filament seen end-on, the projection of the filament should lie entirely within a rectangle of height "a" and width "b" having its centre at the theoretical position of the centre of the filament.

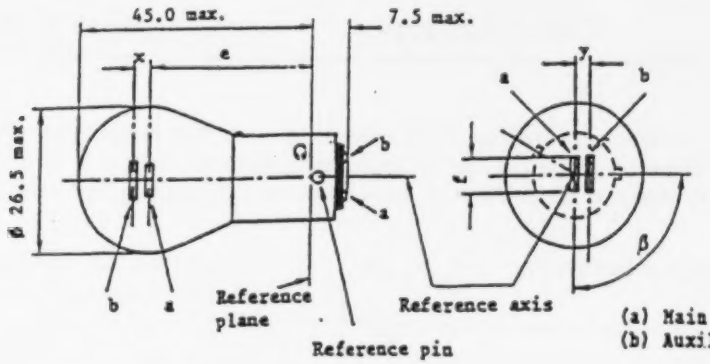
3. Front elevation
The lamp being placed with the cap down and the reference axis vertical, the lamp being viewed in a direction at right angles to the filament axis:

3.1. the projection of the filament should lie entirely within a rectangle of height "a" and width "h" centred on the theoretical position of the centre of the filament; and

3.2. the centre of the filament should not be offset by more than the

CATEGORY P21/4W

Sheet P21/4W/1



(a) Main (high-wattage) filament
(b) Auxiliary (low-wattage) filament

Dimensions in mm	Lamps of normal production			Standard filament lamp
	min.	nom.	max.	
e		31.8 1/		31.8 ± 0.3
f			7.0 1/	7.0 $^{+0}_{-2}$
lateral deviation			1/	0.3 max 2/
x, y		1/		2.8 ± 0.5
β	75° 1/	90° 1/	105° 1/	90° ± 5
Cap BAZ 15d in accordance with IEC Publication 61 (sheet 7004-11C-1)				

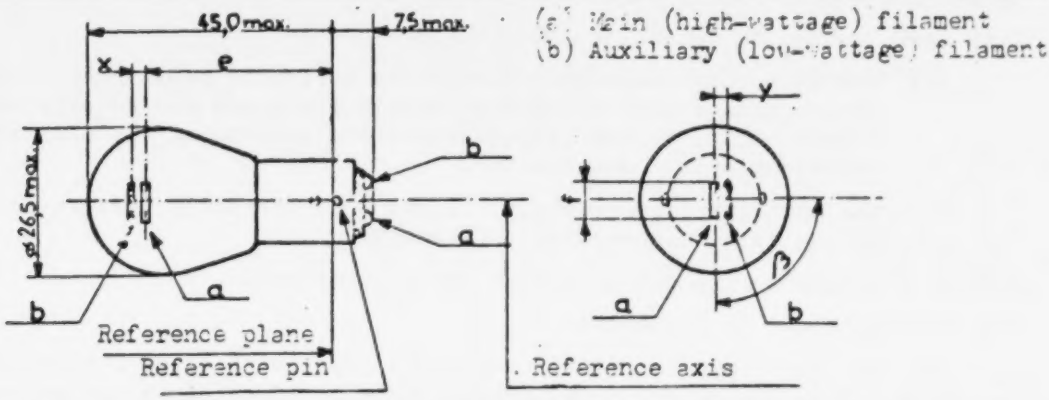
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS						
Rated values	Volts	12		24		12
	Watts	21	4	21	4	21/4
Test voltage	Volts	13.5		28		
Objective values	Watts	25	5	28	8	25/5 at 13.5V
	± %	6	10	6	10	6 and 10
	Luminous flux lm	440	15	440	20	
	± %	15	20	15	20	
Reference luminous flux : 440 lm and 15 lm at approximately 13.5 V						

1/ These dimensions should be checked by means of a "box system" */ based on the dimensions and tolerances shown above. "x" and "y" refer to the main (high wattage) filament, not to the lamp axis. Means of increasing the positioning accuracy of the filament and of the cap-holder assembly are under consideration.

2/ Maximum lateral deviation of main filament centre from two reciprocally perpendicular planes both containing reference axis and one containing axis of pins.

* The "box-system" is the same as for filament lamp P21/5W.

CATEGORY P21/5W Sheet P21/5W/1



(a) Main (high-wattage) filament
(b) Auxiliary (low-wattage) filament

DIMENSIONS in mm		Filament lamps of normal production						Standard filament lamp
		min.		nom.		max.		
e				31.8 1/				31.8 ± 0.3
f						7.0 1/		7.0 -0 -2
Lateral deviation						1/		0.3 max 2/
x, y				1/				2.8 ± 0.3
β		75° 1/		90°		105° 1/		90° ± 5°
Cap BAY 15d in accordance with IEC Publication 61 (sheet 7004-11B-5)								
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS								
Rated values	Volts	6		12		24 3/		12
	Watts	21	5	21	5	21	5	21/5
Test voltage	Volts	6.75		13.5		28.0		
Objective values	Watts ± %	26	6	25	6	38	10	25 and 6 at 13.5V
		6	10	6	10	6	10	6 and 10
	Luminous flux lm ± %	440	35	440	35	440	40	
		15	20	15	20	15	20	
Reference luminous flux : 440 lm and 35 lm at approx. 13.5V.								

1/ These dimensions should be checked by means of a "box system" (P21/5W/2, P21/5W/3) based on the dimensions and tolerances shown above. "x" and "y" refer to the main (high-wattage) filament, not to the lamp axis (P21/5W/2).

Means of increasing the positioning accuracy of the filament and of the cap-holder assembly are under consideration.

2/ Maximum lateral deviation of main (high-wattage) filament centre from two mutually perpendicular planes both containing reference axis and one containing axis of pins.

3/ The 24-volt filament lamp is not recommended for future embodiments.

CATEGORY P21/5W Sheet P21/5W/2.

Screen projection requirements

This test is used to determine, by checking whether:

(a) the main (high-wattage) filament is correctly positioned relatively to the reference axis and the reference plane and has an axis perpendicular, within ± 15°, to the plane through the centres of the pins and the reference axis; and whether

(b) the auxiliary (low-wattage) filament is correctly positioned relatively to the main (high-wattage) filament,

whether a filament lamp complies with the requirements.

Test procedure and requirements

1. The lamp is placed in a holder (socket) capable of being rotated about its axis and having either a calibrated scale or fixed stops corresponding to the angular-displacement tolerance limits, i.e. ± 15°. The holder is then so rotated that an end view of the main (high-wattage) filament is seen on the screen onto which the image of the filament is projected. The end view of the main (high-wattage) filament should be obtained within the angular-displacement tolerance limits (± 15°).

2. Side elevation

The lamp being placed with the cap down, the reference axis vertical, the reference pin to the right and the main (high-wattage) filament seen end-on:

2.1. the projection of the main (high-wattage) filament should lie entirely within a rectangle of height "a" and width "b" having its centre at the theoretical position of the centre of the filament.

2.2. the projection of the auxiliary (low-wattage) filament should lie entirely:

2.2.1. within a rectangle of width "c" and height "d" having its centre at a distance "v" to the right of and at a distance "u" above the theoretical position of the centre of the main (high-wattage) filament;

2.2.2. above a straight line tangential to the upper edge of the projection of the main (high-wattage) filament and rising from left to right at an angle of 25°;

2.2.3. to the right of the projection of the main (high-wattage) filament.

3. Front elevation

The lamp being placed with the cap down and the reference axis vertical, the lamp being viewed in a direction at right angles to the axis of the main (high-wattage) filament:

3.1. the projection of the main (high-wattage) filament should lie entirely within a rectangle of height "a" and width "h" centred on the theoretical position of the centre of the filament;

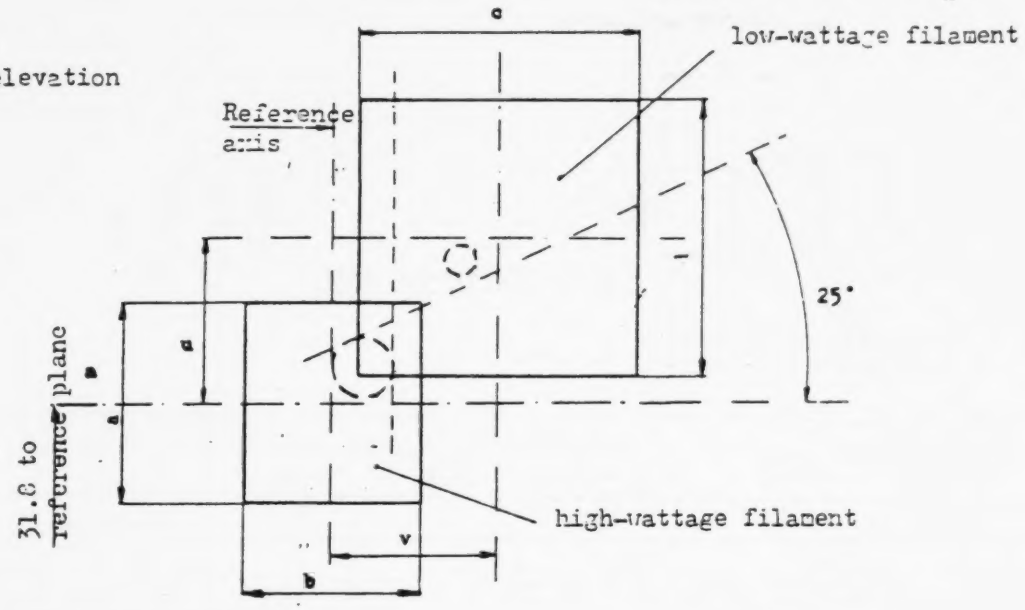
3.2. the centre of the main (high-wattage) filament should not be offset by more than the distance "k" from the reference axis;

3.3. the centre of the auxiliary (low-wattage) filament shall not be offset from the reference axis by more than ± 2 mm (± 0.4 mm for standard filament lamps).

CATEGORY P21/5W Sheet P21/5W/3

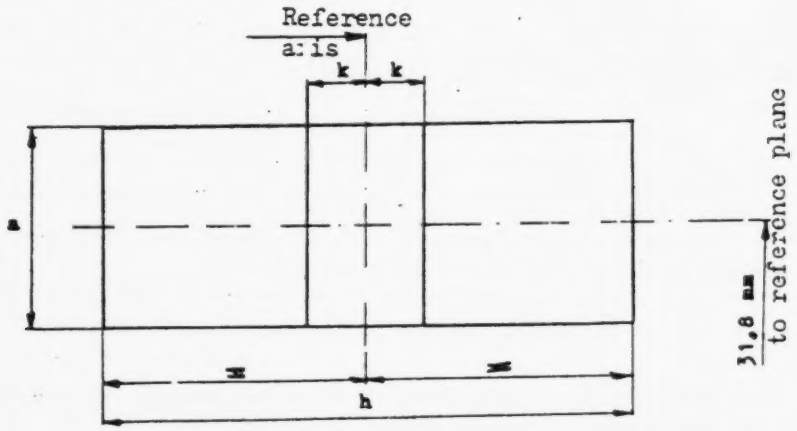
Dimensions in millimetres

Side elevation



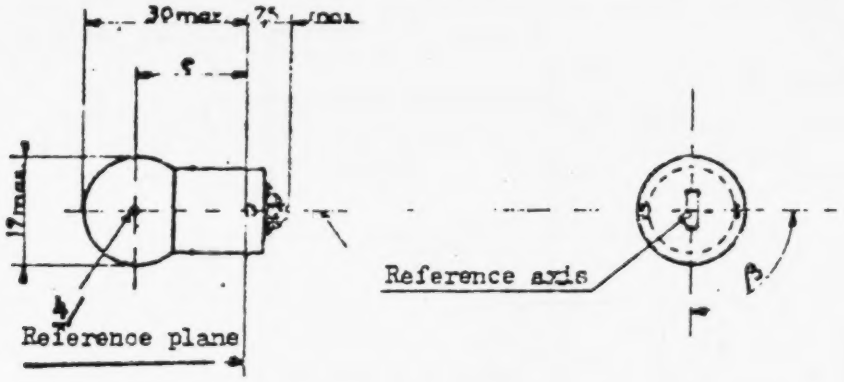
Reference	a	b	c	d	u	v
Dimensions	3.5	3.0	4.8		2.8	

Front elevation



Reference	a	h	k
Dimension	3.5	9.0	1.0

CATEGORY R5W Sheet R5W/1



DIMENSIONS in mm	Filament lamps of normal production			Standard filament lamp
	min.	nom.	max.	
e	17.5	19.0	20.5	19.0 ± 0.3
Lateral deviation 2/			1.5	0.3 max
β	60°	90°	120°	90° ± 5°

Cap BA 15 s in accordance with IEC Publication 61 (sheet 7004-11A-6) 1/

ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS

Rated values	Volts	6	12	24 3/	12
	Watts	5			5
Test voltage	Volts	6.75	13.5	28.0	
Objective values	Watts ± %	5		7	5 at 13.5V
		10			10
	Luminous flux lm ± %	50			
		20			

Reference luminous flux : 50 lm at approx. 13.5V

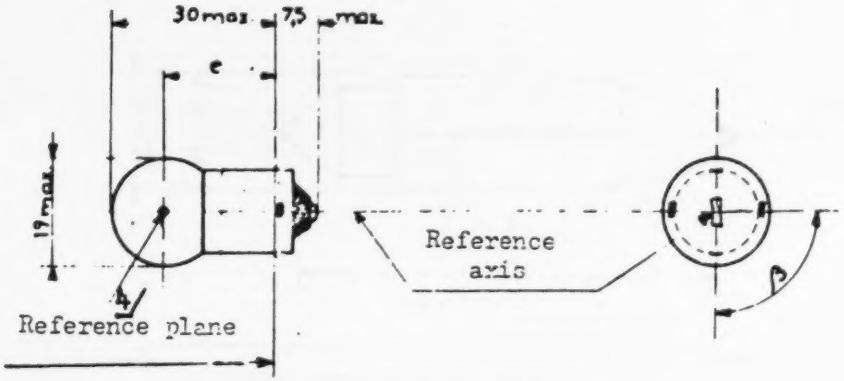
1/ Filament lamps with cap BA 15 d may be used for special purposes; they have the same dimensions.

2/ Maximum lateral deviation of filament centre from two reciprocally perpendicular planes both containing reference axis and one containing axis of pins.

3/ For 24-volt heavy-duty lamps having a different filament shape, additional specifications are under consideration.

4/ See paragraph 3.5.3.

CATEGORY R10W Sheet R10W/1



DIMENSIONS in mm		Filament lamps of normal production			Standard filament lamp
		min.	nom.	max.	
e		17.5	19.0	20.5	19.0 ± 0.3
Lateral deviation 2/				1.5	0.3 max
β		60°	90°	120°	90° ± 5°
Cap BA 15 s in accordance with IEC Publication 61 (sheet 7004-11A-6) 1/					
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS					
Rated values	Volts	6	12	24 3/	12
	Watts		10		10
Test voltage	Volts	6.75	13.5	28.0	
Objective values	Watts ± %		10	12.5	10 at 13.5V
			10		10
	Luminous flux lm ± %		125		
			20		
Reference luminous flux : 125 lm at approx. 13.5V					

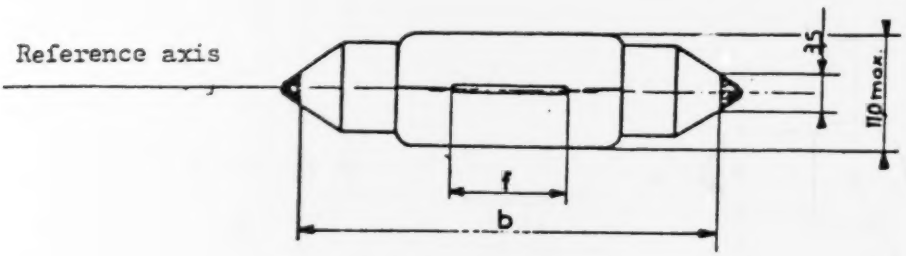
1/ Filament lamps with cap BA 15 d may be used for special purposes; they have the same dimensions.

2/ Maximum lateral deviation of filament centre from two reciprocally perpendicular planes both containing reference axis and one containing axis of pins.

3/ For 24-volt heavy-duty filament lamps having a different filament shape, additional specifications are under consideration.

4/ See paragraph 3.5.3.

CATEGORY C5W Sheet C5W/1



DIMENSIONS in mm	Filament lamps of normal production			Standard filament lamp
	min.	nom.	max.	
b 1/	34.0	35.0	36.0	35 ± 0.5
f 2/ 3/	7.5 4/		15 5/	9 ± 1.5

Cap SV 8.5 in accordance with IEC Publication 61 (sheet 7004-81-3)

ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS

Rated values	Volts	6	12	24	12
	Watts	5			5
Test voltage	Volts	6.75	13.5	28.0	
Objective values	Watts ± %	5		7	5 at 13.5 V
		10			10
	Luminous flux lm ± %	45			
		20			
Reference luminous flux : 45 lm at approx. 13.5 V					

1/ This dimension corresponds to the distance between two apertures of 3.5 mm diameter each bearing against one of the caps.

2/ The filament must be housed in a cylinder 19 mm long co-axial with the filament lamp axis and placed symmetrically about the lamp centre. The diameter of this cylinder is for 6-volt and 12-volt filament lamps: d + 4 mm (for standard filament lamps: d + 2 mm) and for 24-volt filament lamps: d + 5 mm, "d" being the nominal diameter of the filament as stated by the manufacturer.

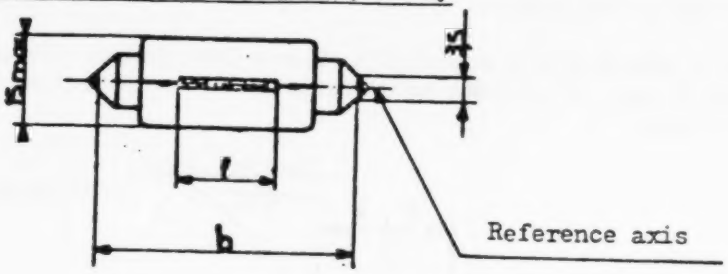
3/ The deviation of the filament centre from the centre of the lamp's length should not be more than ± 2.0 mm (for standard filament lamps: ± 0.5 mm) measured in the direction of the reference axis.

4/ 4.5 mm for 6-volt filament lamps.

5/ 16.5 mm for 24-volt filament lamps.

CATEGORY C21W Sheet C21W/1

Filament lamps for reversing lamps only



DIMENSIONS in mm		Filament lamps of normal production			Standard filament lamp
		min.	nom.	max.	
b 1/		40.0	41.0	42.0	41 ± 0.5
f 2/		7.5		10.5	8 ± 1
Cap SV 8.5 in accordance with IEC Publication 61 (sheet 7004-81-3)					
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS					
Rated values	Volts		12		12
	Watts		21		21
Test voltage	Volts		13.5		
Objective values	Watts ± %		25		25 at 13.5 V
			6		6
	Luminous flux lm ± %		460		
			15		
Reference luminous flux : 460 lm at approx. 13.5 V					

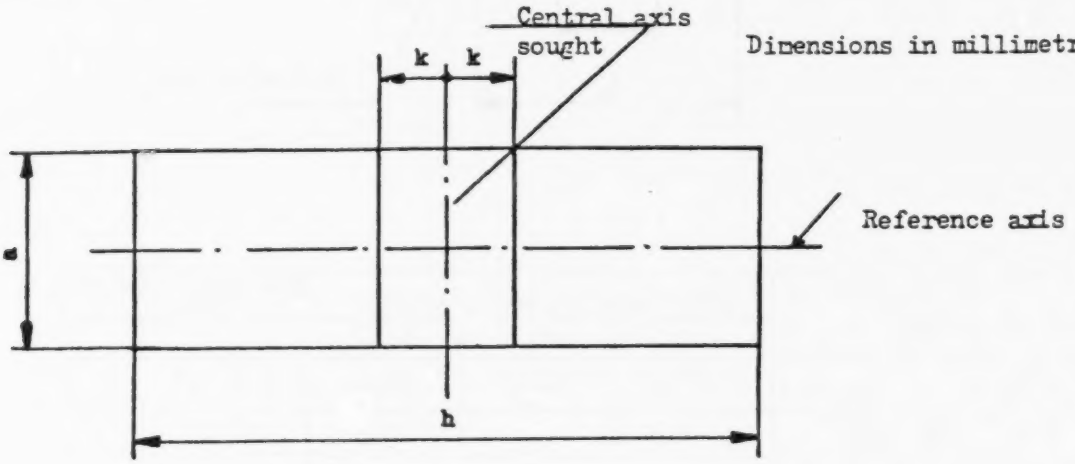
1/ This dimension corresponds to the distance between two apertures of 3.5 mm diameter.

2/ The position of the filament is checked by means of a "box system", sheet C21W/2.

CATEGORY C21W Sheet C21W/2

Screen Projection Requirements

This test is used to determine, whether a filament lamp complies with the requirements by checking, whether the filament is correctly positioned relatively to the reference axis and to the centre of the lamp's length.



	a	h	k
12V	4.0 + d	14.5	2.0

d = nominal diameter of filament as stated by the manufacturer.

For standard filament lamps: a = 2.0 + d k = 0.5

Test procedure and requirements

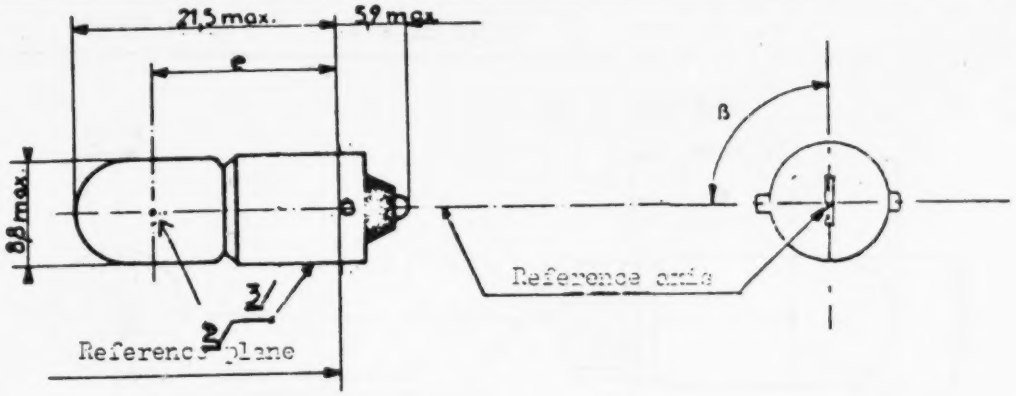
1. The lamp is placed in a holder (socket) capable of being so rotated through 360° about the reference axis and that the front elevation is seen on the screen onto which the image of the filament is projected. The reference plane on the screen should coincide with the centre of the lamp. The central axis sought on the screen should coincide with the centre of the lamp's length.

2. Front elevation

   2.1 The projection of the filament shall lie entirely within the rectangle when the lamp is rotated through 360°.

   2.2 The centre of the filament shall not be offset by more than the distance "k" from the central axis sought.

CATEGORY T4W Sheet T4W/1



DIMENSIONS in mm	Filament lamps of normal production			Standard filament lamp
	min.	nom.	max.	
e	13.5	15.0	16.5	15.0 ± 0.3
Lateral deviation 1/			1.5	0.5 max.
ß		90°		90° ± 5°
Cap BA 9s in accordance with IEC Publication 61 (sheet 7004-14-6) 3/				
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS				

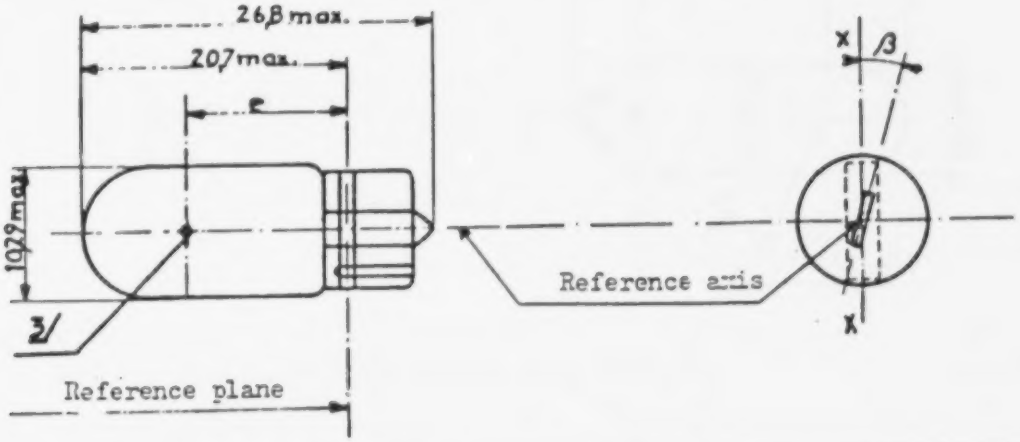
Rated values	Volts	6	12	24	12
	Watts	4			4
Test voltage	Volts	6.75	13.5	28.0	
Objective values	Watts ± %	4		5	4 at 13.5V
		10			10
	Luminous flux lm ± %	35			
		20			
Reference luminous flux : 35 lm at approx. 13.5V					

1/ Maximum lateral deviation of filament centre from two reciprocally perpendicular planes both containing reference axis and one containing axis of pins.

2/ See paragraph 3.5.3.

3/ Over the entire length of the cap there must be no projections or soldering extending beyond the permissible maximum diameter of the cap.

CATEGORY W3W Sheet W3W/1



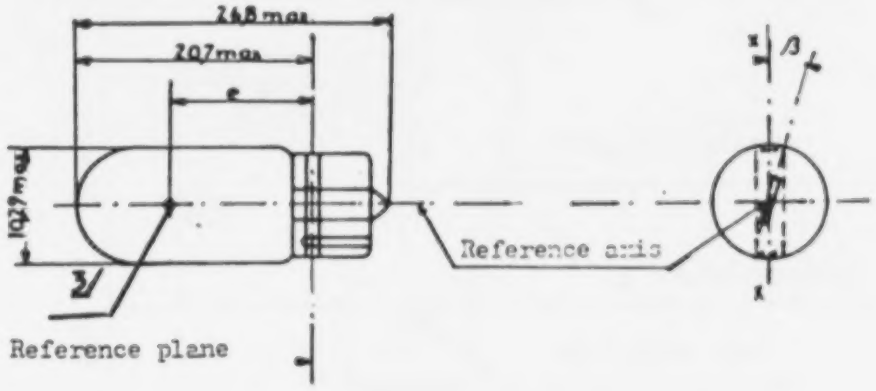
DIMENSIONS in mm		Filament lamps of normal production			Standard filament lamp
		min.	nom.	max.	
e		11.2	12.7	14.2	12.7 ± 0.3
Lateral deviation 2/				1.5	0.5 max
β		- 15°	0°	+ 15°	0° ± 5°
Cap W 2, 1 x 9, 5d in accordance with IEC Publication 61 (sheet 7004-91-2) 1/					
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS					
Rated values	Volts	6	12	24	12
	Watts	5			5
Test voltage	Volts	6.75	13.5	28.0	
Objective values	Watts ± %	5		7	5 at 13.5V
		10			10
	Luminous flux 1 m ± %	50			
		20			
Reference luminous flux : 50 lm at approx. 13.5V					

1/ This type is protected by patents; ISO/IEC conditions apply.

2/ Maximum lateral deviation of filament centre from two reciprocally perpendicular planes both containing reference axis and one containing axis XX.

3/ See paragraph 3.5.3.

CATEGORY W5W Sheet W5W/1



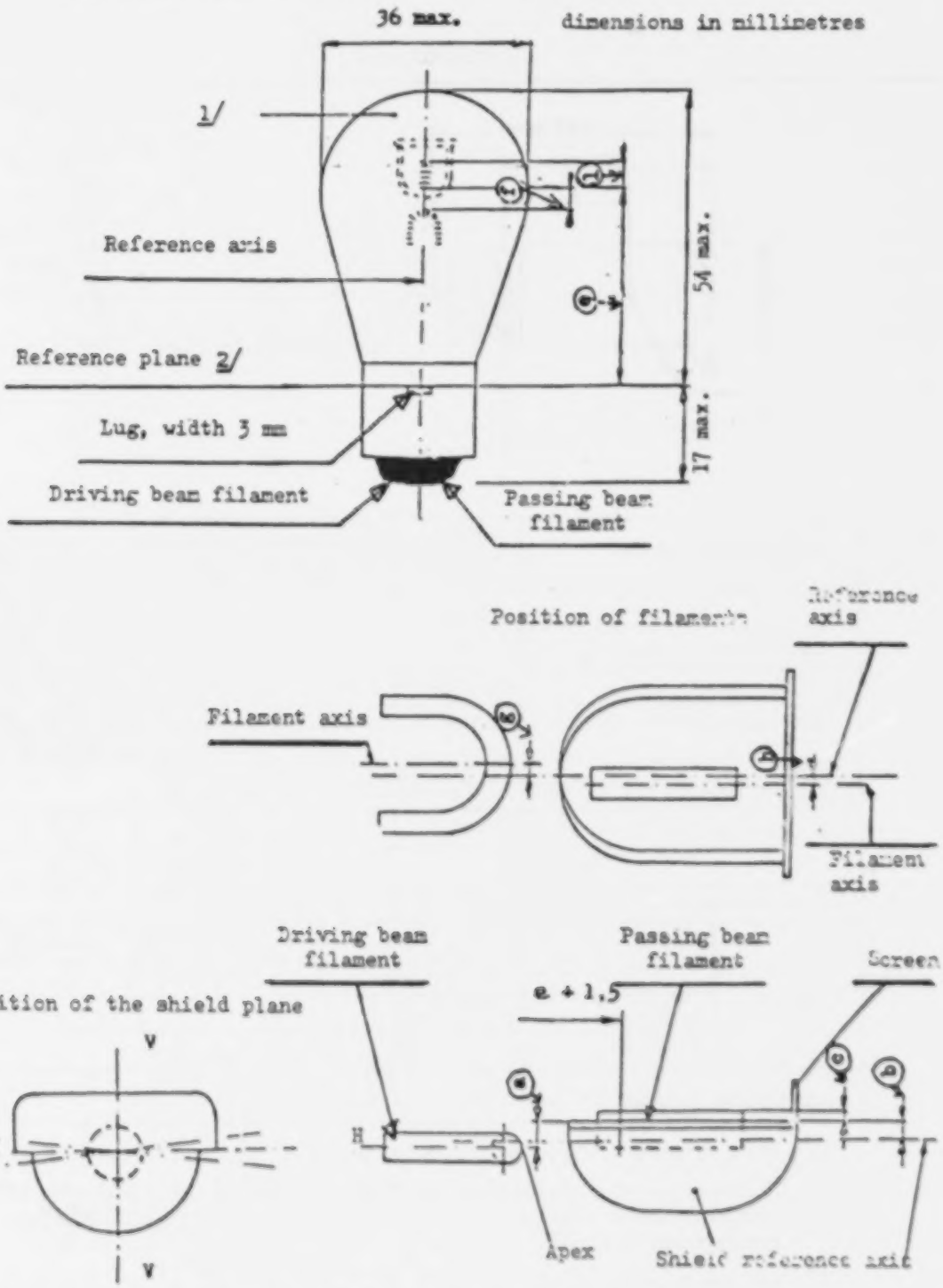
DIMENSIONS in mm		Filament lamps of normal production			Standard filament lamp
		min.	nom.	max.	
e		11.2	12.7	14.2	12.7 ± 0.3
Lateral deviation 2/				1.5	0.5 max
β		- 15°	0°	+ 15°	0° ± 5°
Cap W.2, 1 x 9, 5d in accordance with IEC Publication 61 (sheet 7004-91-2) 1/					
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS					
Rated values	Volts	6	12	24	12
	Watts	3			3
Test voltage	Volts	6.75	13.5	28.0	
Objective values	Watts ± %	3		4	3 at 13.5V
		15			15
	Luminous flux lm ± %	22			
		30			
Reference luminous flux : 22 lm at approx. 13.5V					

1/ This type is protected by patents; ISO/IEC conditions apply.

2/ Maximum lateral deviation of filament centre from two reciprocally perpendicular planes both containing reference axis and one containing axis XX.

3/ See paragraph 5.5.3.

CATEGORIES S1 AND S2 FILAMENT LAMPS FOR MOTOR CYCLES



Note
Plane V-V contains the reference axis and the centre line of the lugs.
Plane H-H (the normal position of the shield) is perpendicular to plane V-V and contains the reference axis.

CATEGORY S1 AND S2 FILAMENT LAMPS - DIMENSIONS				
	Filament lamps of normal production 5/			Standard filament lamp
Dimensions mm	min.	nom.	max.	
e	32.35	32.70	33.05	32.7 ± 0.15
f	1.4	1.8	2.2	1.8 ± 0.2
l	4	5.5	7	5.5 ± 0.5
c 3/	0.2	0.5	0.8	0.5 ± 0.15
b 3/	-0.15	0.2	0.55	0.2 ± 0.15
a 3/	0.25	0.6	0.95	0.6 ± 0.15
h	-0.5	0	0.5	0 ± 0.2
s	-0.5	0	0.5	0 ± 0.2
δ 3/ 4/	-2° 30'	0	2° 30'	0° ± 1°
Cap B15d in accordance with Publication IEC 61 (sheet 7004-12-5)				

ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS						
CATEGORY S1 FILAMENT LAMP						
		Filament lamps of 5/ normal production				Standard filament lamp
Rated values	Volts	6		12		6
	Watts	25	25	25	25	25 25
Test Voltage	Volts	6.75		13.5		-
Objective values	Watts	25	25	25	25	25 25 at 6.75 V
	± %	5		5		5
	Lumens	435	315	435	315	-
	± %	20		20		-
Reference luminous flux: 398 lm and 284 lm respectively at approx. 6 V						
CATEGORY S2 FILAMENT LAMPS						
		Filament lamps of 5/ normal production				Standard filament lamp
Rated values	Volts	6		12		12
	Watts	35	35	35	35	35 35
Test voltage	Volts	6.3		13.5		-
Objective values	Watts	35	35	35	35	35 35 at 13.5 V
	± %	5		5		5
	Lumens	650	465	650	465	-
	± %	20		20		-
Reference luminous flux: 568 lm and 426 lm respectively at approx. 12 V						

Notes

1/ Colourless or selective-yellow bulb; the photometric specifications of the table refer to colourless bulbs.

2/ The reference plane is perpendicular to the reference axis and touches the upper surface of the lug having a width of 4.5 mm.

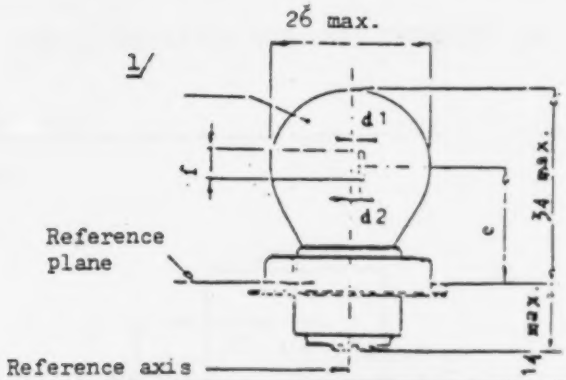
3/ Dimensions a, b, c and β refer to a plane parallel to the reference plane and cutting the two edges of the shield at a distance of e + 1.5 mm.

4/ Admissible angular deviation of the shield plane position from the normal position.

5/ Type approval requirements. Requirements for the conformity of production are under consideration.

CATEGORY S3 FILAMENT LAMP FOR MOPEDS

Dimensions in mm



Filament lamps of normal production				Standard filament lamp
Dimensions (mm)	min.	nom.	max.	
e 2/	19.0	19.5	20.0	19.5 ± 0.25
f (6 V)			3.0	2.5 ± 0.5
f (12 V)			4.0	
d 1, d 2 3/	- 0.5	0	+ 0.5	± 0.3

Cap P26s in accordance with Publication IEC 61 (sheet 7004-36-1)

ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS

Rated values	Volts	6	12	6
	Watts	15		15
Test voltage	Volts	6.75	13.5	
Objective Values	Watts	15		15 at 6.75 V
	± %	6		6
	Lumen	240		
	± %	15		

Reference luminous flux: 240 lm at approx. 6.75 V

1/ Colourless or selective-yellow bulb; the photometric specifications of the table refer to colourless bulbs.

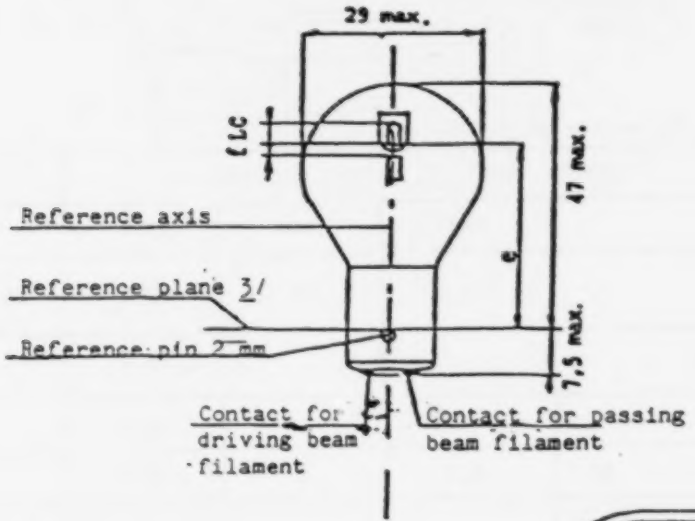
2/ Distance related to the luminous centre of gravity.

3/ Lateral deviation of filament axis with respect to the reference axis. It is sufficient to check this deviation in two reciprocally perpendicular planes.

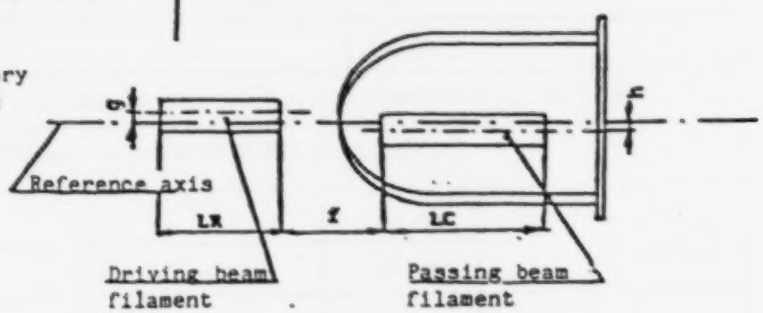
CATEGORY: S4 FILAMENT LAMP FOR MOPED HEADLAMP

Cap: BAX 15d

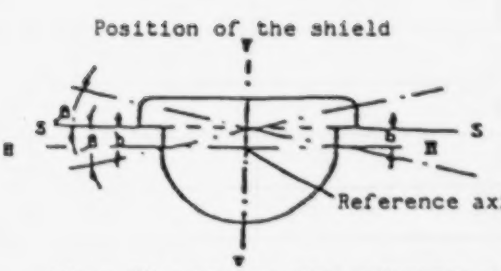
dimensions in mm

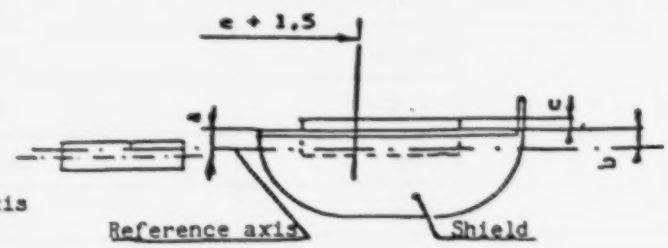


The drawing is not mandatory with respect to the design of the shield



Position of the shield





Plane VV contains the reference axis and the centre line of the reference pin.
Plane HH contains the reference axis and is perpendicular to plane VV.
Objective position of plane SS through the shield edges parallel to plane HH.

CATEGORY: S4 FILAMENT LAMP FOR MOPED HEADLAMP — CAP: BAX 15d — S4/2

	Filament lamps of normal production			Standard filament lamp
Dimension (mm)	min.	nom.	max.	
e	33.25	33.6	33.95	33.6 ± 0.15
f	1.45	1.8	2.15	1.8 ± 0.2
LC, LR	2.5	3.5	4.5	3.5 ± 0.5
c 2/	0.05	0.4	0.75	0.4 ± 0.15
b 2/	-0.15	0.2	0.55	0.2 ± 0.15
a 2/	0.25	0.6	0.95	0.6 ± 0.15
h	-0.5	0	0.5	0. ± 0.2
g	-0.5	0	0.5	0 ± 0.2
β 2/ 5/	-2°30'	0	2°30'	0 ± 1°
Cap 1/	BAX 15d			

ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS

Rated voltage	V	6			12			6	
Rated wattage 6/	W	15	15		15	15		15	15
Test voltage	V	6.75			13.5				
Objective wattage 6/	W	15	15		15	15		15 [at 6.75 V]	15
Tolerance ±	%	6			6			6	
Objective lum.flux.lm		180	125	190	180	125	190		
4/ 6/		min.	min.	max.	min.	min.	max.		

Reference luminous flux: 240 lm (driving beam), 160 lm (passing beam) at approx. 6 V 4/

CATEGORY S4

Notes

1/ Cap in accordance with IEC Publication 61 in preparation.

2/ Dimensions a, b, c and β refer to a plane parallel to the reference plane and cutting the two edges of the shield at a distance of e + 1.5 mm.

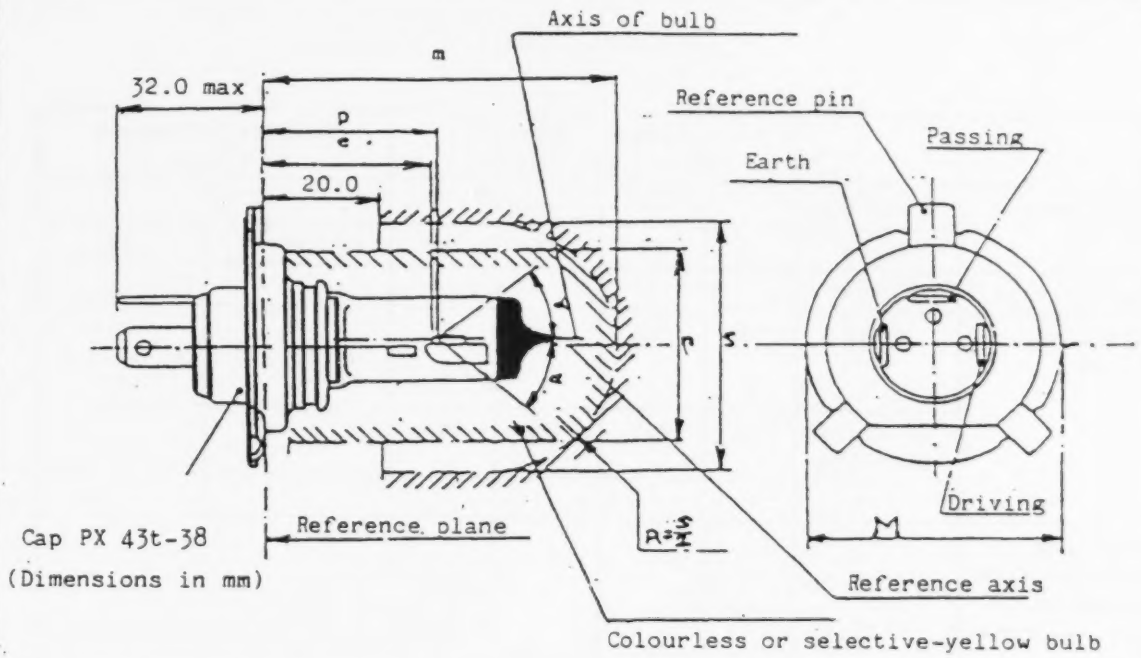
3/ The reference plane is perpendicular to the reference axis and touches the upper surface of the pin having a length of 2 mm.

4/ Colourless or selective yellow bulb, the photometric specifications of the table refer to the colourless bulb.

5/ Admissible deviation of the plane through the shield edges from the objective position.

6/ Values in the left-hand column refer to the driving beam filament, values in the right-hand column refer to the passing beam filament.

CATEGORY HS_1: HALOGEN MOTOR CYCLE FILAMENT LAMP Sheet HS 1/1



The drawings are not mandatory; their sole purpose is to show which dimensions must be verified.

Reference	Dimension		Tolerance	
	6V	12V	6V	12V
e	28.5		+0.45 -0.25	
p	28.95		-	
m 1/	max. 60.0		-	
n 1/	max. 34.5		-	
s 2/	45.0		-	
α 3/	max. 40°		-	

TO BE USED ON
MOTOR CYCLES ONLY

CATEGORY HS_1: HALOGEN MOTOR CYCLE FILAMENT LAMP Sheet HS 1/2

Characteristics

		Filament lamps of normal production				Standard filament lamps	
Rated values	Volts	6[4/]		12[4/]		12[4/]	
	Watts	35	35	35	35	35	35
Test Voltage	Volts	6.3		13.2			
Objective values	Watts	35	35	35	35	35 at 13.2 V	35 at 13.2 V
	± %	5	5	5	5	5	5
	Luminous flux 1 m	700	440	825	525		
	± %	15					
Measuring luminous flux according to para. 3.8 of this Regulation	1 m				450		
Reference luminous flux at approximately 12 V 1m						700	450
CapPX43t-38 in accordance with IEC Publication 61 (sheet 7004-34-1)							

CATEGORY HS_1: HALOGEN MOTOR CYCLE FILAMENT LAMP Sheet HS 1/3

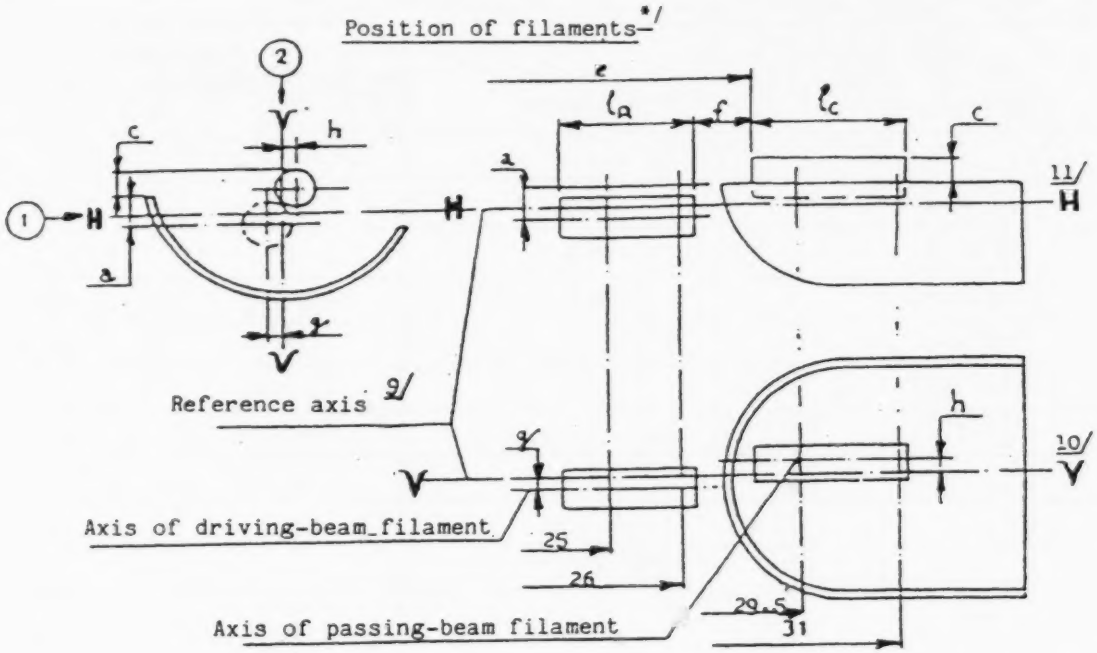
Table of the dimensions referred to in the diagrams on sheets 4 and 5 (in mm)

Reference		Dimension		Tolerances		
				Filament lamps of normal production		Standard filament lamp
6V	12V	6 V	12V	6V	12 V	12V
a/26 */		0.0		± 0.35		± 0.2
a/25 */		0.0		±0.55		± 0.2
b_1/29.5 */		0		± 0.35		± 0.2
b_1/33 */		b1/29.5 mv		± 0.35		± 0.15
b_2/29.5 */		0		± 0.35		± 0.2
b_2/33 */		b2/29.5 mv		± 0.35		± 0.15
c/29.5 */		0.5		± 0.35		± 0.2
c/31 */		c/29.5 mv		± 0.30		± 0.15
d		min. 0.1 max. 1.5		-		-
e 7/		28.5		± 0.45 0.25		+ 0.2 - 0.0
f 5/ 6/ 8/		1.7		+ 0.50 - 0.30		+ 0.3 - 0.1
g/25 */		0		± 0.5		± 0.3
g/25 */		0		± 0.7		± 0.3
h/29.5 */		0		± 0.5		± 0.3
h/31 */		h/29.5		±0.30		± 0.2
l_R 5/ 8/		3.5	4.0	± 0.8		± 0.4
l_C 5/ 6/		3.3	4.5	± 0.8		± 0.35
p/33 */		Depends on the shape of the shield		-		-
q/33 */		$\frac{p+q}{2}$		± 0.6		± 0.3

*/ Dimension to be measured at the distance from the reference plane indicated in mm after the stroke.

CATEGORY HS_1: HALOGEN MOTOR CYCLE FILAMENT LAMP

Sheet HS 1/4

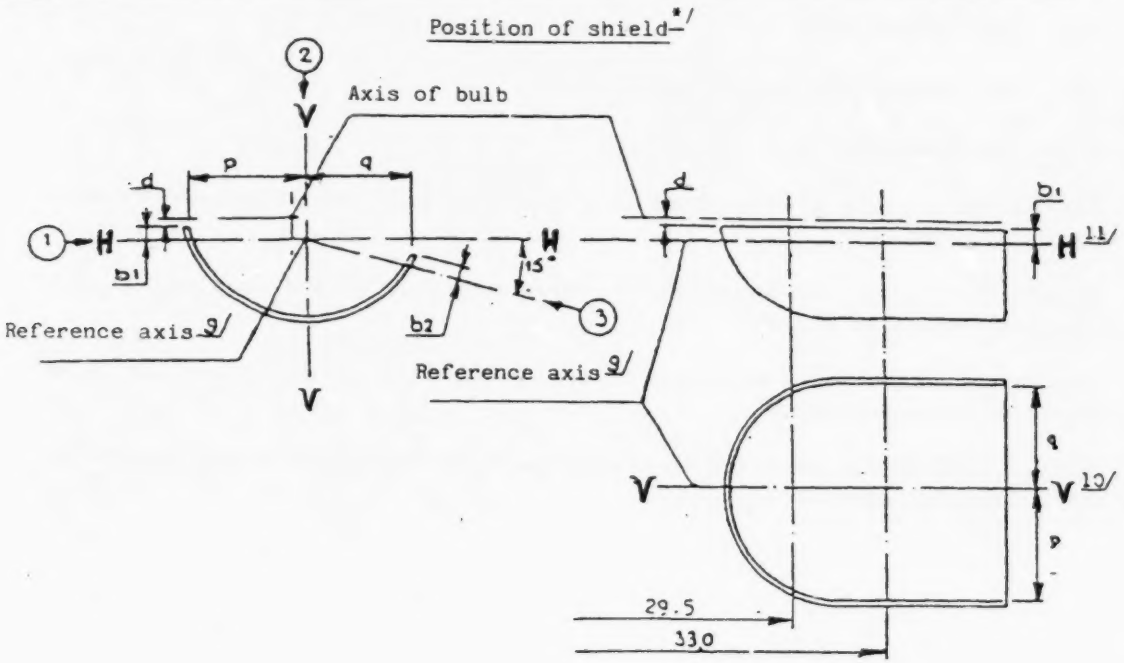


Dimensions in millimetres

*/ The drawing is not mandatory with respect to the design of the shield.

CATEGORY HS_1: HALOGEN MOTOR CYCLE FILAMENT LAMP

Sheet HS1/5



*/ The drawing is not mandatory with respect to the design of the shield.

CATEGORY HS_1 Sheet $HS_{1/6}$

Additional explanations to Sheets HS1/4 and HS1/5

The dimensions below are measured in three directions:

(1) for dimension a, b_1, c, d, e, f, l_r and l_C;

(2) for dimensions g, h, p and q;

(3) for dimension b_2.

Dimensions p and q are measured in a plane parallel to 33 mm away from the reference plane.

Dimensions b_1, b_2, are measured in planes parallel to and 29.5 and 33 mm away from the reference plane.

Dimensions a and g are measured in planes parallel to and 25 mm and 26 mm away from the reference plane.

Dimensions c and h measured in planes parallel to and 29.5 and 31 mm away from the reference plane.

CATEGORY HS_1: HALOGEN MOTOR CYCLE FILAMENT LAMP

1/ Where a yellow outer bulb is used, "m" and "n" denote the maximum dimensions of this bulb; where there is no outer bulb, "m" denotes the maximum length of the lamp.

2/ It must be possible to insert the filament lamp into a cylinder of diameter "s" concentric with the reference axis and limited at one end by a plane parallel to and 20 mm distant from the reference plane and at the other end by a hemisphere of radius $\frac{s}{2}$.

3/ The obscuration must extend at least as far as the cylindrical part of the bulb. It must also overlap the internal shield when the latter is viewed in a direction perpendicular to the reference axis. The effect sought by obscuration may also be achieved by other means.

4/ The values indicated in the left-hand column relate to the driving beam. Those indicated in the right-hand column relate to the passing beam.

5/ The end turns of the filaments are defined as being the first luminous turn and the last luminous turn that are at substantially the correct helix angle. For coiled-coil filaments, the turns are defined by the envelope of the primary coil.

6/ For the passing-beam filament the points to be measured are the intersections, seen in direction (1), of the lateral edge of the shield with the outside of the end turns defined under footnote 5.

7/ "e" denotes the distance from the reference plane to the beginning of the passing-beam filament as defined above.

8/ For the driving-beam filament the points to be measured are the intersections, seen in direction (1), of a plane, parallel to plane HH and situated at a distance of 0.8 mm below it, with the end turns defined under footnote 5.

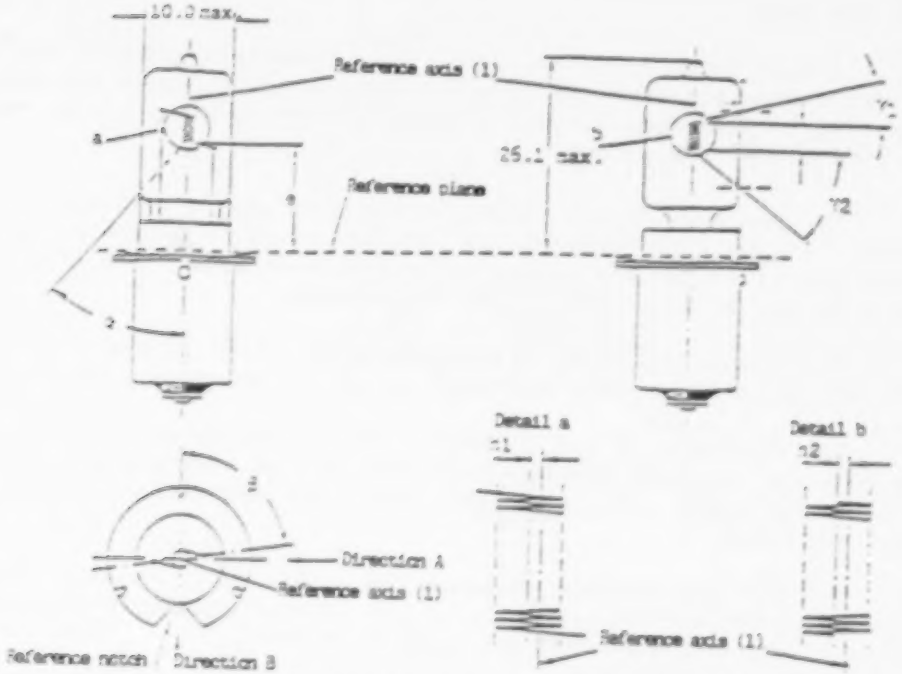
9/ The reference axis is the line perpendicular to the reference plane and passing through the centre of the circle of diameter "M" (see Sheet 1).

10/ Plane VV is the plane perpendicular to the reference plane and passing through the reference axis and through the intersection of the circle of diameter "M with the axis of the reference pin.

11/ Plane HH is the plane perpendicular to both the reference plane and plane VV and passing through the reference axis.

CATEGORY HS_2: HALOGEN MOPED FILAMENT LAMP

Sheet HS2/1



Dimensions in mm	Filament lamps of normal production			Standard filament lamp
	Minimum	Nominal	Maximum	
e		11.0 (2)		11.0 ± 0.15
f (6 V) (6)	1.5	2.5	3.5	2.5 ± 0.15
f (12 V) (6)	3.0	3.0	4.0	
f1, f2		(3)		0 ± 0.15
α (4)			40	
β (5)	- 15°	90°	+ 15°	90° ± 5°
γ_1 (7)	15°			15° min.
γ_2 (7)	40°			40° min.
Cap PX13.5a in accordance with IEC Publication 61 (Sheet 7004-35-1)				
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS				
Rated values	Volts (6)	6	12	6
	Watts	15	15	15
Test voltage	Volts	6.75	13.5	
Objective values	Watts ± % Luminous flux lm ± %	15 6 320 15	15 6 320 15	15.0 à 6.75 V 6
Reference luminous flux: 320 lm at approximately 6.75 volts				

CATEGORY HS_2: HALOGEN MOPED FILAMENT LAMP Sheet HS2/2

(1) The reference axis is perpendicular to the reference plane and passes through the intersection of this plane with the axis of the cap ring.

(2) To be reserved.

(3) To be checked by means of the 'box system' sheet HS2/3.

(4) All parts which may obscure the light or may influence the light beam shall lie within angle α.

(5) Angle β denotes the position of the plane through the inner leads with reference to the reference notch.

(6) In order to avoid rapid lamp failure the supply voltage shall not exceed 8.5 V for 6 V lamps and 15 V for 12 V filament lamps.

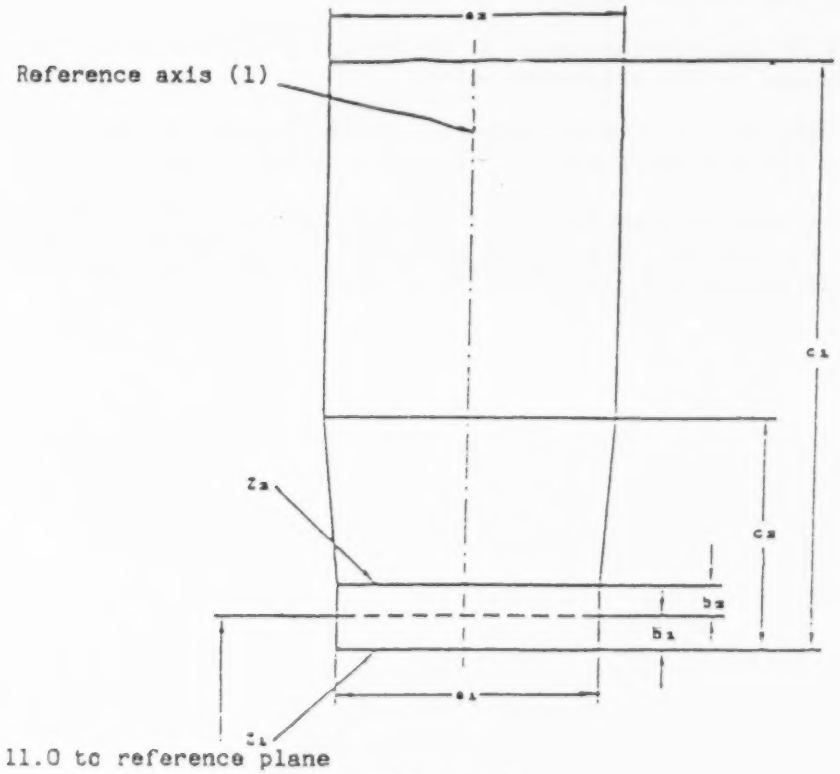
(7) In the area between the outer legs of the angles $\gamma 1$ and $\gamma 2$ the bulb shall have no optically distorting areas and the curvature of the bulb must have a radius not less than 50% of the actual bulb diameter.

CATEGORY HS_2: HALOGEN MOPED FILAMENT LAMP Sheet HS2/3

Screen Projection Requirements

This text is used to determine whether a filament lamp complies with the requirements, by checking whether the filament is correctly positioned in relation to the reference axis and the reference plane.

All dimensions in mm



View A + B

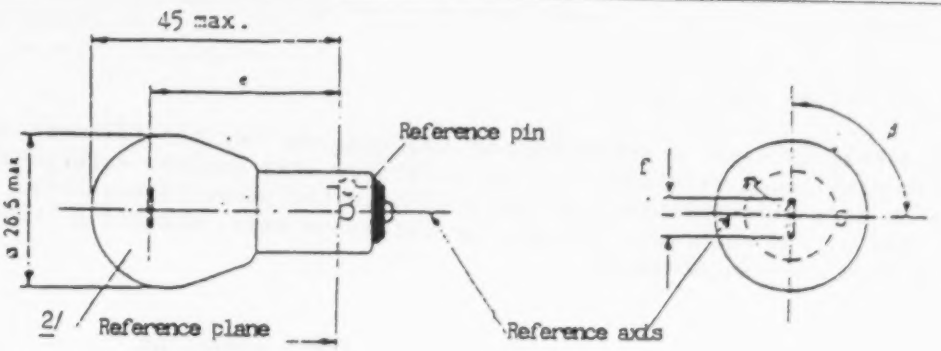
Reference	a1	a2	b1	b2	c1 (6 V)	C1 (12 V)	c2
Dimension	d + 1.0	d + 1.4	0.25	0.25	4.0	4.5	1.75

d = actual filament diameter

The filament must lie entirely within the limits shown.

The beginning of the filament must lie between lines Z1 and Z2.

CATEGORY PY21W: AMBER COLOURED FILAMENT LAMP Sheet PY21W/1



Dimensions in mm	Filament lamps of normal production			Standard filament lamp
	Minimum	Normal	Maximum	
e		31.8 3/		31.8 ± 0.3
f 4/			7.0	7.0 + 0 − 2
β	75°	90°	105°	90 ± 5°
Lateral deviation 1/		3/		0.3 max.
Cap BAU 15: in accordance with IEC Publication 61 (sheet 7004-19-1)				

ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS

Rated values	Volts	12	24	12
	Watts	21		21
Test voltage	Volts	13.5	28.0	
Objective values	Watts	25	28	25 at 13.5 V
	± %	6		6
	Luminous flux lm	280		
	± %	20		
Reference luminous flux: 280 lm at approximately 13.5 V				

1/ Maximum lateral deviation of filament centre from two mutually perpendicular planes both containing the reference axis of cap and one containing the axis of the reference pin.

2/ The bulb shall be amber.

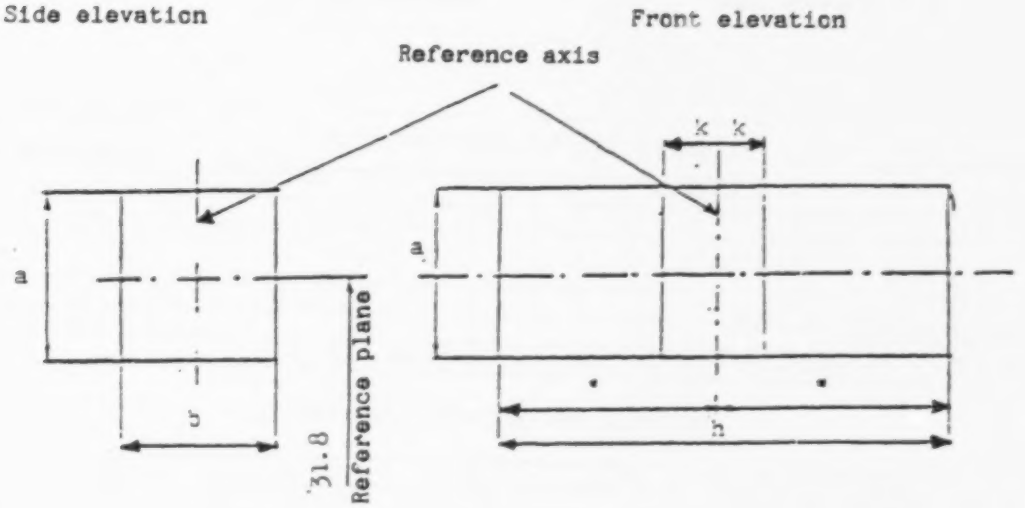
3/ To be checked by means of a 'box system', sheet PY21W/2.

4/ For 24-Volt heavy-duty lamps having a different filament shape, additional specifications are under consideration.

CATEGORY PY21W: AMBER COLOURED FILAMENT LAMP Sheet PY21W/2

Screen projection requirements

This test is used to determine, by checking whether the filament is correctly positioned relatively to the reference axis and the reference plane and has an axis perpendicular, within ± 15°, to the plane through the centre-line of the reference pin and the reference axis, whether a filament lamp complies with the requirements.



Reference	a	b	h	k
Dimension	3.5	3.0	9.0	1.0

Dimensions in mm

Test procedures and requirements

1. The lamp is placed in a holder (socket) capable of being rotated about its axis and having either a calibrated scale or fixed stops corresponding to the angular-displacement tolerance limits, i.e. ± 15°. The holder is then so rotated that an end view of the filament is seen on the screen on to which the image of the filament is projected. The end view of the filament should be obtained within the angular-displacement tolerance limits (± 15°).

CATEGORY PY21W : AMBER COLOURED FILAMENT LAMP Sheet PY21W/3

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2. Side elevation

The lamp being placed with the cap down, the reference axis vertical, and the filament seen end-on, the projection of the filament should lie entirely within a rectangle of height 'a' and with 'b' having its centre at the theoretical position of the centre of filament.

3. Front elevation

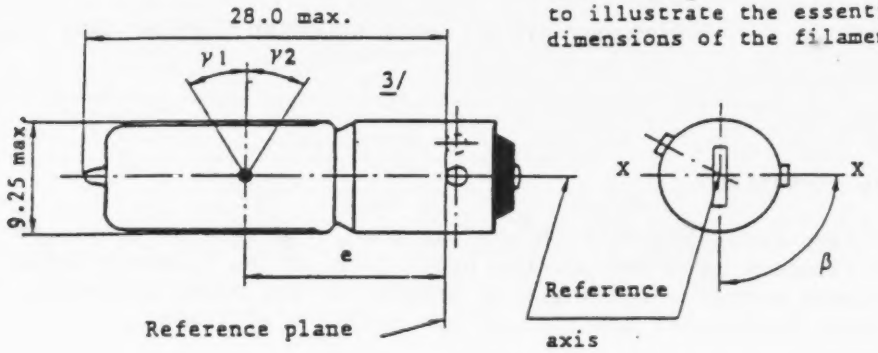
The lamp being placed with the cap down and the reference axis vertical, the lamp being viewed in a direction at right angles to the filament axis:

3.1 the projection of the filament should lie entirely within a rectangle of height 'a' and width 'h' centred on the theoretical position of the centre of the filament;

3.2 the projection of the filament should not be offset by more than the distance 'k' from the reference axis.

CATEGORY H6W Sheet H6W

Dimensions in millimetres
The drawings are intended only to illustrate the essential dimensions of the filament lamp



Dimensions in mm	Filament lamps of normal production			Standard filament lamp
	min.	nom.	max.	
e	14.25	15.0	15.75	15.0 ± 0.25
Lateral deviation 1/			0.75	0.4 max.
β	82.5	90	97.5	90° ± 5°
γ1 2/	30°			30°
γ2 2/	30°			30°
Cap BAX9s in accordance with IEC Publication 61 (sheet 7004-8-1)				
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS				
Rated values — Volts			12	12
Rated values — Watts			6	6
Test voltage — Volts			13.5	
Objective values — Watts ± %			7	7 at 13.5V
			5	5
Objective values — Luminous flux lm ± %			125	
			12	
Reference luminous flux : 125 lm at approx. 13.5V				

1/ Maximum lateral deviation of filament centre from two reciprocally perpendicular planes both containing the reference axis and one containing axis X - X.

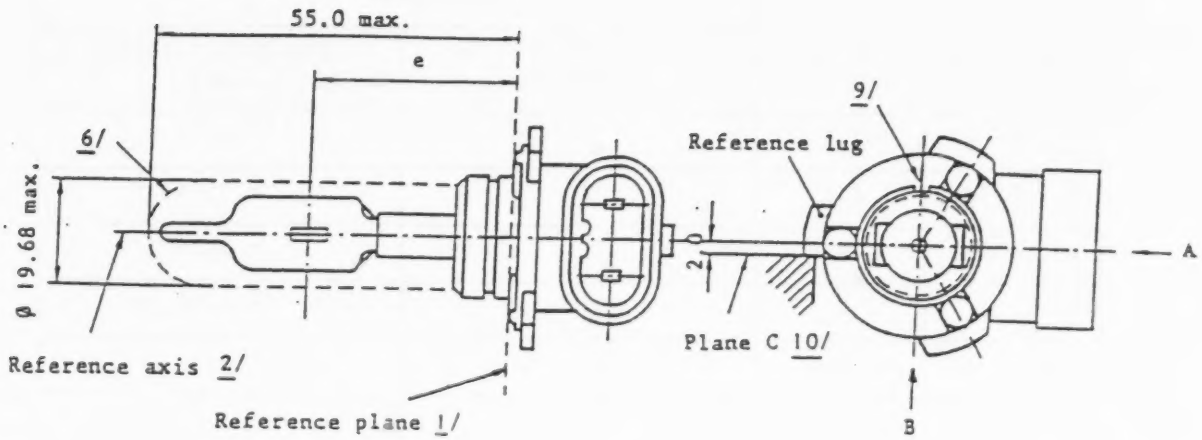
2/ In the area between the outer legs of the angles γ_1 and γ_2 the bulb shall have no optically distorting areas and the curvature of the bulb shall have a radius not less than 50% of the actual bulb diameter.

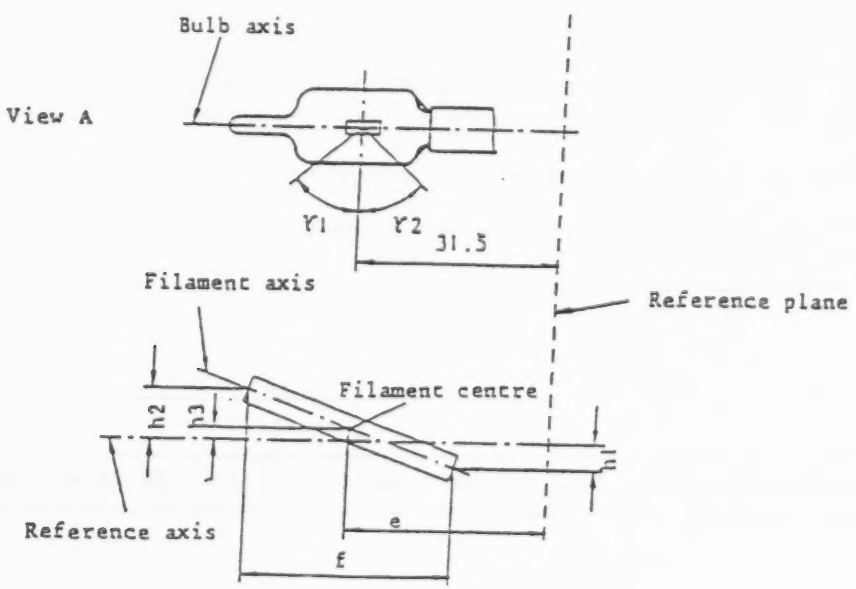
3/ Over the entire length of the cap there shall be no projections or soldering exceeding the permissible maximum diameter of the cap.

CATEGORY HB3 Sheet HB3/1

Dimensions in millimetres

The drawings are intended only to illustrate essential dimensions of the filament lamp.





CATEGORY HB3 Sheet HB3/2

Dimensions in mm 11/		Tolerances	
		Filament lamps of normal production	Standard filament lamp
e 8/ 4/	31.5	7/	± 0.16
f 8/ 4/	5.1	7/	± 0.16
h1, h2	0	7/	± 0.15 3/
h3	0	7/	± 0.08 3/
γ1 5/	45° min.	-	-
γ2 5/	52° min.	-	-
Cap P 20d in accordance with IEC Publication 61 (sheet 7004-31-1)			
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS			
Rated values	Volts	12	12
	Watts	60	60
Test voltage	Volts	13.2	13.2
Objective values	Watts	73 max.	73 max.
	luminous flux lm	1860	
	± %	12	
Reference luminous flux for headlamp testing : 1 300 lm at approx. 12V.			

CATEGORY HB3 Sheet HB3/3

1/ The reference plane is the plane formed by the meeting points of the cap-holder fit.

2/ The reference axis is the axis perpendicular to the reference plane and concentric with the 17.46 mm diameter of the cap.

3/ The eccentricity is measured only in viewing directions */ A and B as shown in the figure on Sheet HB3/1. The points to be measured are those where the projection of the outside of the end turns nearest to or furthest from the reference plane crosses the filament axis.

4/ The viewing direction is direction */ B as shown in the figure on Sheet HB3/1.

5/ Glass bulb periphery shall be optically distortion-free axially within the angles γ 1 and γ 2. This requirement applies to the whole bulb circumference within the angles γ 1 and γ 2. The bulb shall be colourless or selective-yellow.

6/ Glass bulb and supports shall not exceed the envelope and shall not interfere with insertion past the lamp key. The envelope is concentric to the reference axis.

7/ To be checked by means of a "box system" Sheet HB3/4. */

8/ The ends of the filament are defined as the points where, when the viewing direction */ as defined in footnote 4 above, the projection of the outside of the end turns crosses the filament axis.

9/ The keyway is mandatory.

10/ The filament lamp shall be rotated in the measuring holder until the reference lug contacts plane C of the holder.

11/ Dimensions shall be checked with O-ring removed.

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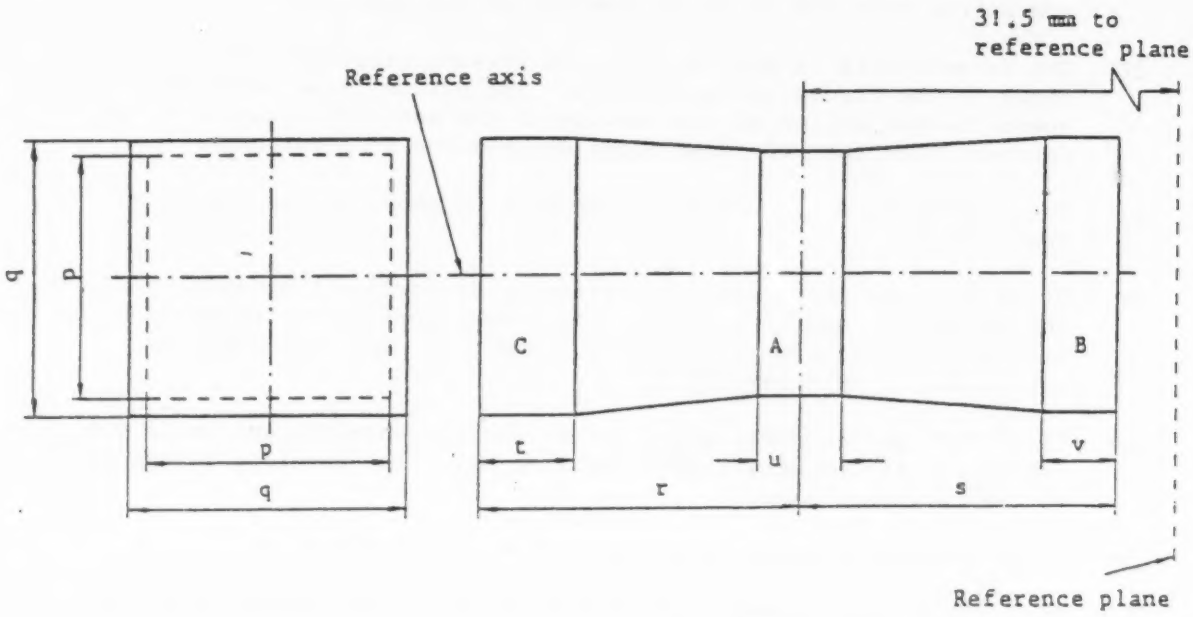
*/ Manufacturers may choose another set of perpendicular viewing directions. The viewing directions specified by the manufacturer are to be used by the testing laboratory when checking filament dimensions and position.

CATEGORY HB3 Sheet HB3/4

Screen projection requirements.

This test is used to determine, by checking whether the filament is correctly positioned relatively to the reference axis and the reference plane, whether a filament lamp compiies with the requirements.



Dimensions in millimetres

	p	q	r	s	t	u	v
12 V	1.3 d	1.6 d	3.0	2.9	0.9	0.4	0.7

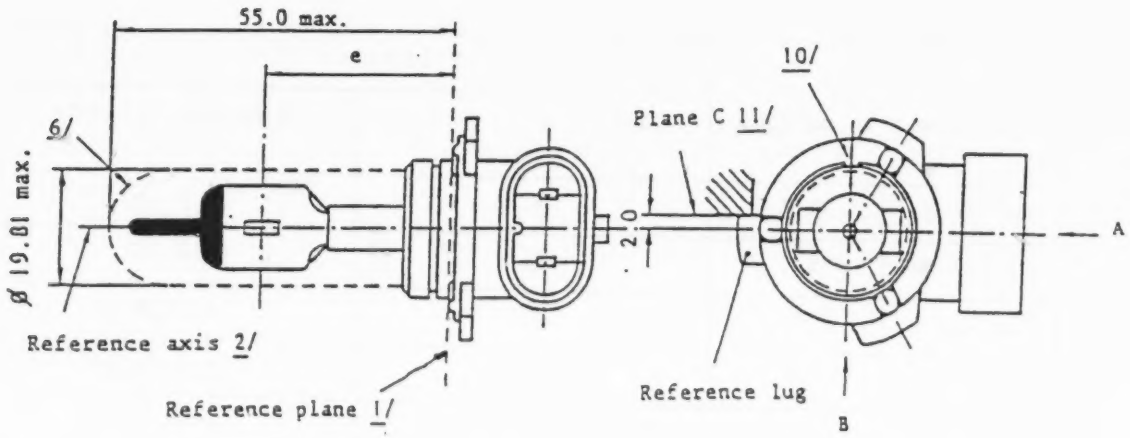
d is the diameter of the filament

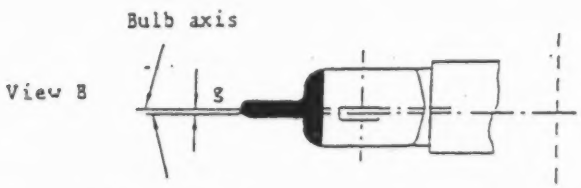
The filament position is checked solely in directions A and B as shown on sheet HB3/1.
The beginning of the filament as defined on sheet HB3/3, note 8, shall be in volume "B" and the end of te filament in volume "C".
The filament shall lie entirely within the limits shown.
Volume "A" does not involve any filament centre requirement.

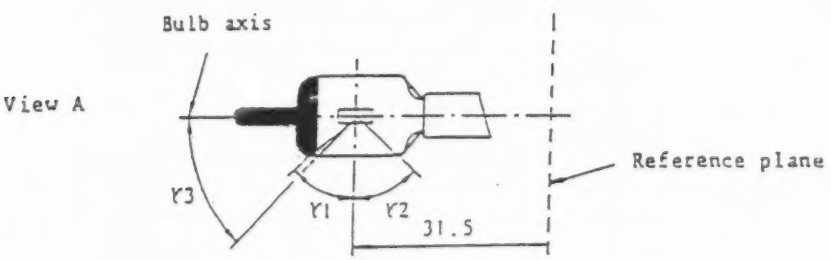
CATEGORY HB4 Sheet HB4/1

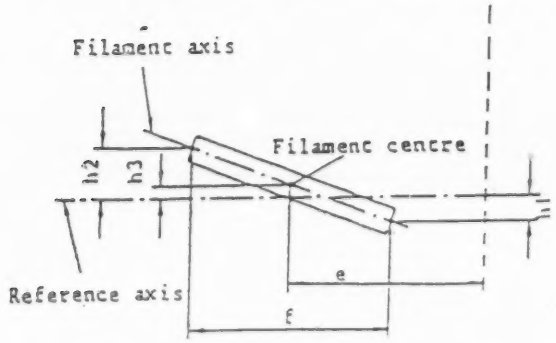
Dimensions in millimetres

The drawings are intended only to illustrate the essential dimensions of the filament lamp.









CATEGORY HB4 Sheet HB4/2

Dimensions in mm 12/		Tolerances	
		Filament lamps of normal production	Standard filament lamp
e 4/ 9/	31.5	8/	± 0.16
f 4/ 9/	5.1	8/	± 0.16
h1, h2	0	8/	± 0.15 3/
h3	0	8/	± 0.08 3/
g 4/	0.75	± 0.5	± 0.3
γ 1 5/	50° min.	-	-
γ 2 5/	52° min.	-	-
γ 3 7/	45°	± 5°	± 5°
Cap P 22d in accordance with IEC Publication 61 (sheet 7004-32-1)			
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS			
Rated values	Volts	12	12
	Watts	51	51
Test voltage	Volts	13.2	13.2
Objective values	Watts	62 max.	62 max.
	luminous flux lm	1095	
	± %	15	
Reference luminous flux for headlamp testing : 825 lm at approx. 12V.			

CATEGORY HB4 Sheet HB4/3

1/ The reference plane is the plane formed by the meeting points of the cap-holder fit.

2/ The reference axis is the axis perpendicular to the reference plane and concentric with the 19.46 mm diameter of the cap.

3/ The eccentricity is measured only in viewing direction */ A and B as shown in the figure on Sheet HB4/1. The points to be measured are those where the projection of the outside of the end turns nearest to or furthest from the reference plane crosses the filament axis.

4/ The viewing direction is direction */ B as shown in the figure on Sheet HB4/1.

5/ Glass bulb periphery shall be optically distortion free axially within the angles γ 1 and γ 2. This requirement applies to the whole bulb circumference within the angles γ 1 and γ 2. The bulb shall be colourless or selective-yellow.

6/ Glass bulb and supports shall not exceed the envelope and shall not interfere with insertion past the lamp key. The envelope is concentric to the reference axis.

7/ The obscuration shall extend at least angle γ 3 and shall be at least as far as the undistorted part of the bulb defined by angle γ 1.

8/ To be checked by means of a "Box system" Sheet HB4/4. */

9/ The ends of the filament are defined on the points where, when the viewing direction */ as defined in footnote 4 above, the projection of the outside of the end turns crosses the filament axis.

10/ The keyway is mandatory.

11/ The filament lamp shall be rotated in the measuring holder until the reference lug contacts plane C of the holder.

12/ Dimensions shall be checked out with O-ring removed.

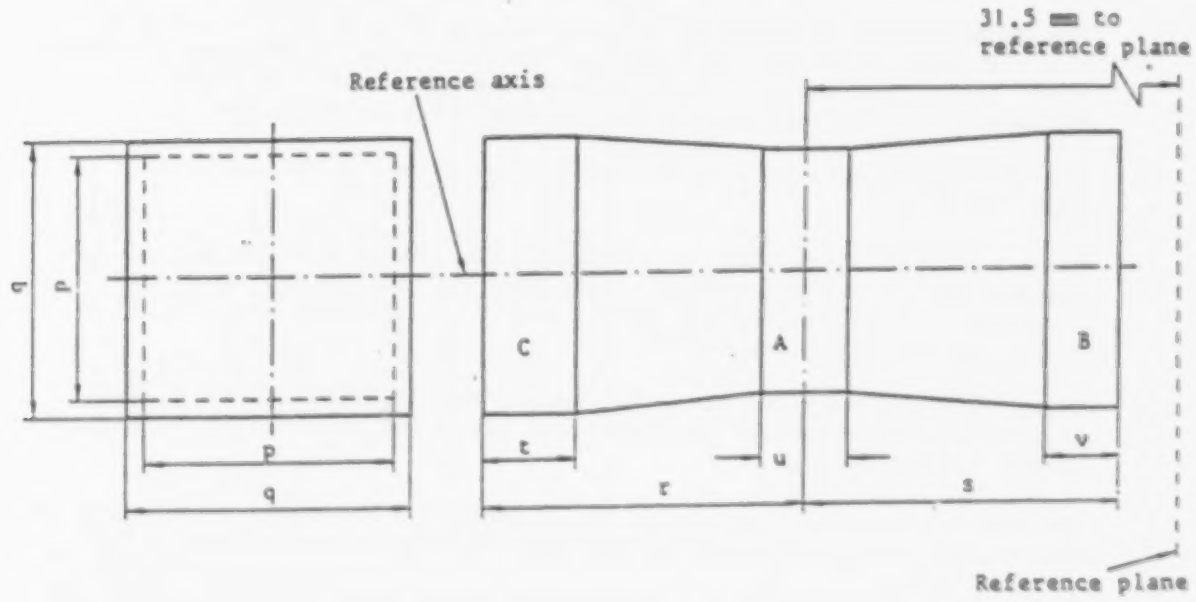
---

*/ Manufacturers may choose another set of perpendicular viewing directions. The viewing directions specified by the manufacturer are to be used by the testing laboratory when checking filament dimensions and tolerances.

CATEGORY HB4 Sheet HB4/4

Screen projection requirements.

This test is used to determine, by checking whether the filament is correctly positioned relatively to the reference axis and the reference plane, whether a filament lamp complies with the requirements.



Dimensions in millimetres

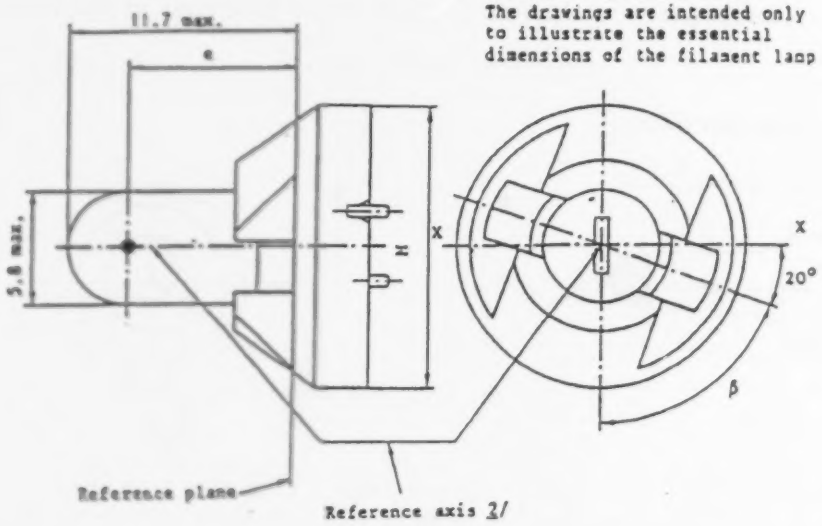
	p	q	r	s	t	u	v
12 V	1.3 d	1.6 d	3.0	2.9	0.9	0.4	0.7

d is the diameter of the filament

The filament position is checked solely in directions A and B as shown on sheet HB4/1.
The beginning of the filament as defined on sheet HB4/3, note 9, shall be in Volume "B" and the end of the filament in volume "C".
The filament shall lie entirely within the limits shown.
Volume "A" does not involve any filament centre requirement.

CATEGORY T1.4W Sheet T1.4W/1

Dimensions in millimetres
The drawings are intended only to illustrate the essential dimensions of the filament lamp



Dimensions in mm	Filament lamps of normal prod.			Standard filament lamp
	min.	nom.	max.	
e	7.6	8.3	9.0	8.3 ± 0.35
Lateral deviation 1/			0.7	0.35 max.
β	55°	70°	85°	70° ± 5°
Cap P11.5d in accordance with IEC Publication 61 (sheet 7004-79-1)				
ELECTRICAL AND PHOTOMETRIC CHARACTERISTICS				
Rated values	Volts	12		12
	Watts	1.4		
Test voltage	Volts	13.5		13.5
Objective values	Watts	1.4		1.4 at 13.5 V
	± %	10		10
	Luminous flux lm	8		
	± %	15		
Reference luminous flux : 8 lm at approx. 13.5 V				

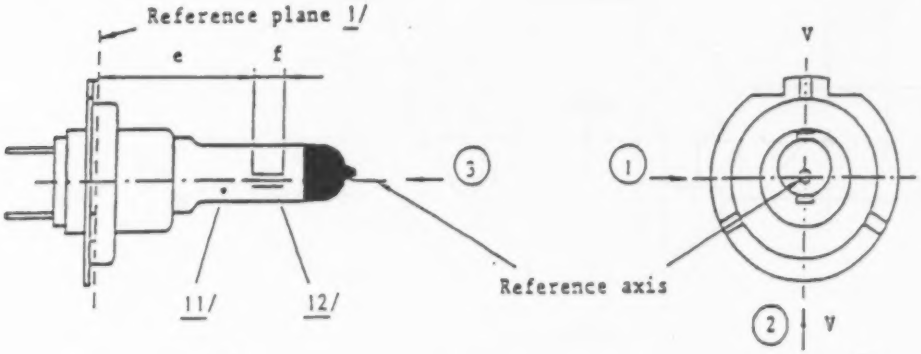
1/ Maximum lateral deviation of filament centre from two mutually perpendicular planes both containing reference axis and one containing axis X-X.

2/ The reference axis is the line perpendicular to the reference plane and passing through the centre of the circle of diameter "M".

CATEGORY H7 Sheet H7/1

The drawings are intended only to illustrate the essential dimensions of the filament lamp.

Dimensions in millimetres



View from (1) Figure 1 Main drawing View from (3)

Figure 2
Maximum lamp outline 3/

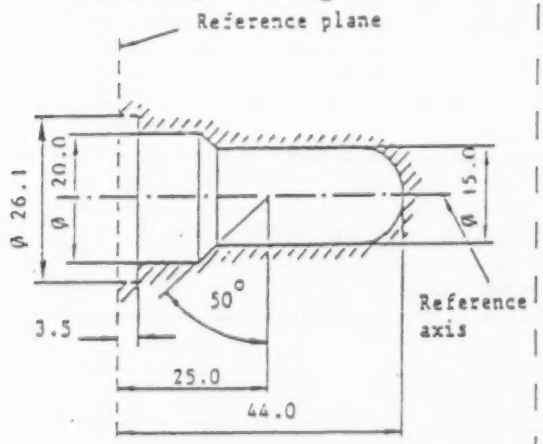


Figure 3
Definition of reference axis 3/

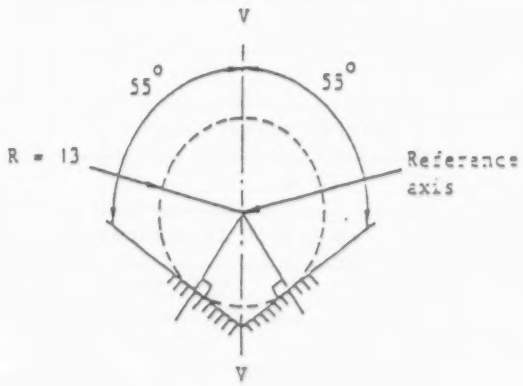
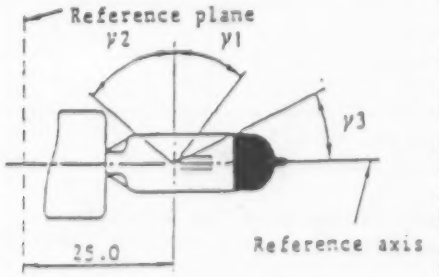
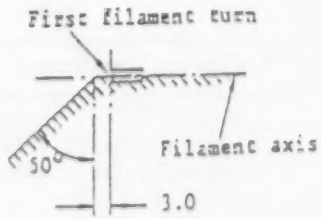


Figure 4
Distortion free area 4/ and black top 5/



View from (2)

Figure 5
Metal free zone 6/



View from (1)

CATEGORY H7 Sheet H7/2

Figure 6
Permissible offset of filament axis 9/
(for standard filament lamps only)

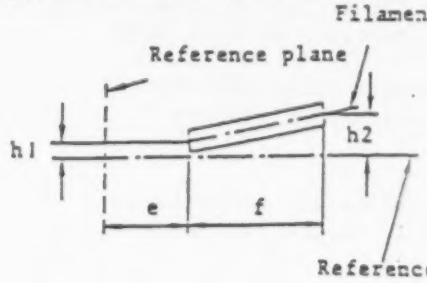
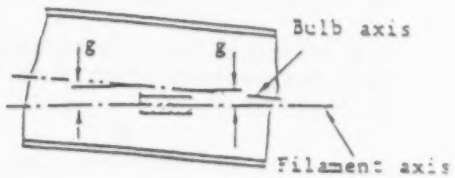


Figure 7
Bulb eccentricity 10/



View from (I)

Rated voltage 12 V

Dimensions in mm		Tolerances	
		Filament lamps of normal production	Standard filament lamp
e 7/	25.0	8/	± 0.1
f 7/	4.1	8/	± 0.1
g 10/	0.5	min.	u.c.
h1 9/	0	8/	± 0.1
h2 9/	0	8/	± 0.15
γ_1 4/	40° min.	-	-
γ_2 4/	50° min.	-	-
γ_3 5/	30° min.	-	-
Cap PX26d in accordance with IEC Publication 61 (sheet 7004-5-1)			
ELECTRICAL AND PEOTOMETRIC CHARACTERISTICS			
Rated values	Volts	12	12
	Watts	55	55
Test voltage	Volts	13.2	13.2
Objective values	Watts	max. 58	max. 58
	luminous flux lm ± %	1500 10	
Reference luminous flux for headlamp testing : 1 100 lm at approx. 12V.			

CATEGORY H7 Sheet H7/3

1/ The reference plane is defined by the points on the surface of the holder on which the three supporting bosses of the cap ring will rest.

2/ The reference axis is perpendicular to the reference plane and crosses the intersection of the two perpendiculars as indicated in figure 3 on Sheet H7/1.

3/ Glass bulb and supports shall not exceed the envelope as indicated in figure 2 on sheet H7/1. The envelope is concentric to the reference axis.

4/ Glass bulb shall be optically distortion free within the angles γ_1 and γ_2. This requirement applies to the whole bulb circumference within the angles γ_1 and γ_2.

5/ The obscuration shall extend at least to angle γ_2 and shall extend at least to the cylindrical part of the bulb on the whole bulb top circumference.

6/ The internal design of the lamp shall be such that stray light images and reflections are only located above the filament itself seen from the horizontal direction. (View (1) as indicated in figure 1 on sheet H7/1). No metal parts other than filament turns shall be located in the shaded area as seen in figure 5 on Sheet H7/1.

7/ The ends of the filament are defined as the points where, when the viewing direction is direction (1) as shown in figure 1 on Sheet H7/1, the projection of the outside of the end turns crosses the filament axis.

8/ To be checked by means of a "Box system". Sheet H7/4.

9/ The offset of the filament with respect to the reference axis is measured only in viewing directions (1) and (2) as shown in figure 1 on Sheet H7/1. The points to be measured are those where the projection of the outside of the end turns nearest to or furthest from the reference plane crosses the filament axis.

10/ Offset of filament in relation to bulb axis measured in two planes parallel to the reference plane where the projection of the outside of the end turns nearest to or furthest from the reference plane crosses the filament axis.

11/ The bulb shall be colourless or selective-yellow.

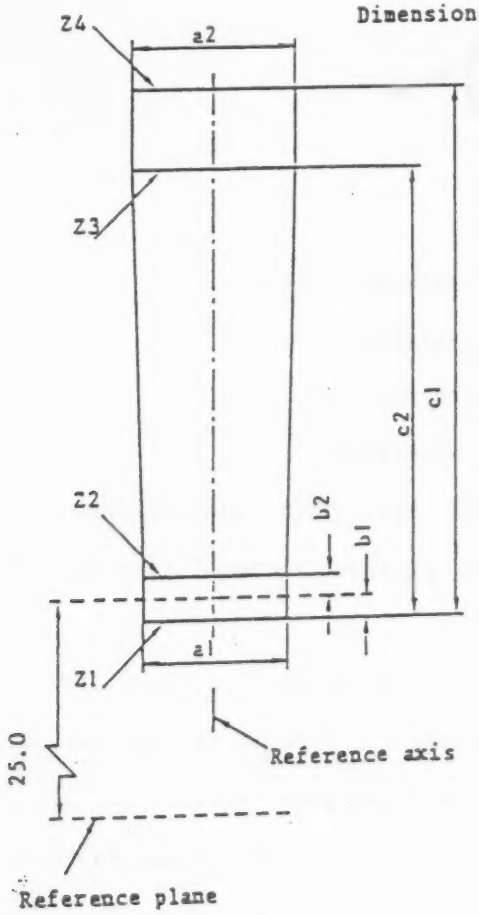
12. Notes concerning the filament diameter
- No actual diameter restrictions apply but the objective for future developments is to have d max. = 1.3 mm.
- For the same manufacturer the design diameter of standard (étalon) filament lamp and filament lamp of normal production shall be the same.

CATEGORY H7 Sheet H7/4

Screen projection requirements

This test is used to determine, by checking whether the filament is correctly positioned relative to the reference axis and the reference plane, whether a filament lamp complies with the requirements.

Dimensions in millimetres



	a1	a2	b1	b2	c1	c2
12V	d + 0.30	d + 0.50	0.2		4.6	4.0

d = diameter of filament

The ends of the filament as defined on sheet H7/3, foot-note 1/, must lie between lines Z1 and Z2 and between lines Z3 and Z4.

The filament position is checked solely in directions (1) and (2) as shown on sheet H7/1, figure 1.

The filament must lie entirely within the limits shown.

Annex 2

COMMUNICATION

(maximum format: A4 (210 x 297 mm))

issued by: Name of administration:
.....
.....
.....

concerning: 2/ APPROVAL GRANTED

APPROVAL EXTENDED

APPROVAL REFUSED

APPROVAL WITHDRAWN

PRODUCTION DEFINITIVELY DISCONTINUED

of a type of filament lamp pursuant to Regulation No. 37

Approval No. ... Extension No. .....

1. Trade name or mark of the device: .....

2. Manufacturer's name for the type of device: .....

3. Manufacturer's name and address: .....

4. If applicable, name and address of the manufacturer's representative:

.....

5. Submitted for approval on: .....

6. Technical service responsible for conducting approval tests: .....

.....

7. Date of report issued by that service: .....

8. Number of report issued by that service: .....

9. Concise description: .....

Category of filament lamp: .....

Rated voltage: .....

Rated wattage: .....

Colour of light emitted: White/selective yellow/amber 2/

10. Position of the approval mark: .....

11. Reason(s) for extension (if applicable) .....

12. Approval granted/extended/refused/withdrawn: 2/ .....

13. Place: .....

14. Date: .....

15. Signature: .....

16. The following documents, bearing the approval number shown above, are available on request: .....

1/ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

2/ Strike out what does not apply.

Annex 3

EXAMPLE OF THE ARRANGEMENT OF THE APPROVAL MARK

(see para. 2.4.3)

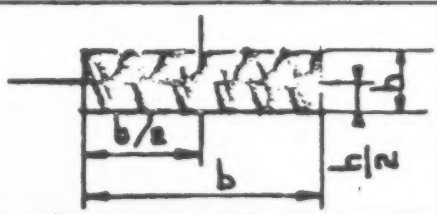
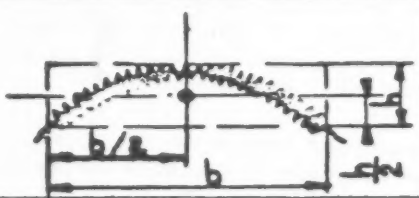
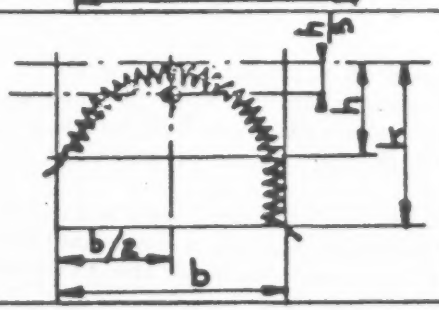
The above approval mark affixed to a filament lamp indicates that the lamp has been approved in the United Kingdom (E11) under the approval code 3A1. The first character of the approval code indicates that the approval was granted in accordance with the requirements of Regulation No. 37 as amended by the 03 series of amendments.

Annex 4

LUMINOUS CENTRE AND SHAPES OF LAMP FILAMENTS

Save as possibly otherwise indicated on the lamp data sheets, this standard is applicable to the determination of the luminous centre of different filament shapes.

The position of the luminous centre depends upon the filament shape.

No.	Filament shapes	Observations
1		With b > 1.5 h, the deviation of the filament axis with respect to a plane normal to the reference axis shall not exceed 15°.
2		Only applicable to filaments which can be inscribed in a rectangle of b > 3h.
3.		Applicable to filaments which can be inscribed in a rectangle of b ≤ 3h, whereby however k < 2h.

The side lines of the circumscribed rectangles in Nos. 2 and 3 are parallel and perpendicular, respectively, to the reference axis.

The luminous centre is the point of intersection of the dash-dot lines.

Annex 5

CHECKING THE COLOUR AND TRANSMISSION OF SELECTIVE-YELLOW BULBS AND OUTER BULBS AND AMBER BULBS

1. General specifications

1.1 The manufacturer shall send to the test laboratory five finished filament lamps with coloured bulb or coloured outer bulb. Filament lamps with coloured outer bulb shall be handled as filament lamps with coloured bulb.

1.2 All the tests shall be made at an ambient temperature of 23°C ± 5°C.

1.3 The tests shall be made at test voltage.

1.4 Before starting each test the stabilisation of the temperature of the filament lamp shall be obtained by operating at test voltage for 10 minutes.

2. Colour

2.1 The colour should be so homogeneous that at visual inspection no essential differences are perceptible.

2.2 Measuring the colour the reference axis of the filament lamp shall be vertical with the cap down. The measuring direction shall be perpendicular to the reference axis and to the axis of the filament too. In case of doubt with regard to homogeneous colour the sample shall be measured in several directions and all shall comply.

2.3 The test shall be made with a measuring system which shows the CIE chromaticity co-ordinates of the received light with an accuracy of ± 0.002.

2.4 In the case of measuring the colour of filament lamps with selective-yellow bulb the measurement shall be made by integrating within a cone having an apex angle of 60° perpendicular to the reference axis of the filament lamp with the origin in the centre of the main beam filament.

2.5 In the case of measuring the colour of filament lamps with amber bulb the measurement shall be made by integrating within a cone having an apex angle of 4° perpendicular to the reference axis of the filament lamp with the origin in the centre of the filament.

3. Transmission

3.1 The transmission shall be such that the emitted luminous flux of the filament lamp lies within the tolerance values specified for the relevant filament lamp in this Regulation.

Annex 6

MINIMUM REQUIREMENTS FOR QUALITY CONTROL PROCEDURES BY THE MANUFACTURER

1. GENERAL

The conformity requirements shall be considered satisfied from a photometric, geometrical, visual and electrical standpoint if the specified tolerances for production filament lamps in the relevant data sheet of annex 1 and the relevant data sheet for the caps are met.

2. MINIMUM REQUIREMENTS FOR VERIFICATION OF CONFORMITY BY THE MANUFACTURER

For each type of filament lamp the manufacturer or the holder of the approval mark shall carry out tests, in accordance with the provisions of this Regulation, at appropriate intervals.

2.1 Nature of tests

Tests of conformity of these specifications shall cover their photometrical, geometrical and optical characteristics.

2.2 Methods used in tests

2.2.1 Tests shall generally be carried out in accordance with the methods set out in this Regulation.

2.2.2 The application of paragraph 2.2.1 requires regular calibration of test apparatus and its correlation with measurements made by a competent authority.

2.3 Nature of sampling

Samples of filament lamps shall be selected at random from the production of a uniform batch. A uniform batch means a set of filament lamps of the same type, defined according to the production methods of the manufacturer.

2.4 Inspected and recorded characteristics

The filament lamps shall be inspected and test results recorded following the grouping of characteristics as listed in annex 7, table 1.

2.5 Criteria governing acceptability

The manufacturer or the holder of the approval is responsible for carrying out a statistical study of the test results in order to meet the specifications laid down for verification of conformity of products in paragraph 4.1 of this Regulation.

Compliance shall be assured if the level of acceptable non-compliance per grouping of characteristics given in table 1 of annex 7 is not exceeded. This means that the number of lamps not complying with the requirement for any grouping of characteristics of any filament lamp type does not exceed the qualifying limits in the relevant table 2, 3 or 4 of annex 7.

Note: Each individual filament lamp requirement shall be considered as a characteristic.

Annex 7

SAMPLING AND COMPLIANCE LEVELS FOR MANUFACTURER TEST RECORDS

Table 1 - Characteristics

Grouping of characteristics	Grouping* of test records between lamp types	Minimum 12 monthly sample per grouping*	Acceptable level of non-compliance per grouping of characteristics (%)
Marking, legibility and durability	All types with the same external dimensions	315	1
Bulb quality	All types with the same bulb	315	1
Colour of the bulb	All coloured bulbs of the same design	315	
External lamp dimensions (excluding cap/ base)	All types of the same category	200	1
Dimensions of caps and bases	All types of the same category	200	6.5
Dimensions related to internal elements**	All lamps of one type	200	6.5
Initial readings, watts and lumens**	All lamps of one type	200	1

* The assessment shall in general cover series production filament lamps from individual factories. A manufacturer may group together records concerning the same type from several factories, provided these operate under the same quality system and quality management.

** In case a filament lamp has more than one inner element (filament, shield) the grouping of characteristics (dimensions, watts, lumens) applies to each element separately.

Qualifying limits for acceptance based on different numbers of test results for each grouping of characteristics are listed in table 2 as maximum number of non-compliances. The limits are based on an acceptable level of 1% of non-compliances, assuming an acceptance probability of at least 0.95.

Table 2

Number of test results of each characteristic	Qualifying limits for acceptance
- 200	5
201 - 260	6
261 - 315	7
316 - 370	8
371 - 435	9
436 - 500	10
501 - 570	11
571 - 645	12
646 - 720	13
721 - 800	14
801 - 860	15
861 - 920	16
921 - 990	17
991 - 1 060	18
1 061 - 1 125	19
1 126 - 1 190	20
1 191 - 1 249	21

Qualifying limits for acceptance based on different number of test results for each grouping of characteristics are listed in table 3 given as maximum number of non-compliances. The limits are based on an acceptable level of 6.5% for non-compliances, assuming an acceptable probability of at least 0.95.

Table 3

Number of lamps in records	Qualifying limit	Number of lamps in records	Qualifying limit	Number of lamps in records	Qualifying limit
- 200	21	609 - 621	52	1 030 - 1 043	83
201 - 213	22	622 - 635	53	1 044 - 1 056	84
214 - 227	23	636 - 648	54	1 057 - 1 070	85
228 - 240	24	649 - 662	55	1 071 - 1 084	86
241 - 254	25	663 - 676	56	1 085 - 1 097	87
255 - 268	26	677 - 689	57	1 098 - 1 111	88
269 - 281	27	690 - 703	58	1 112 - 1 124	89
282 - 295	28	704 - 716	59	1 125 - 1 138	90
296 - 308	29	717 - 730	60	1 139 - 1 152	91
309 - 322	30	731 - 744	61	1 153 - 1 165	92
323 - 336	31	745 - 757	62	1 166 - 1 179	93
337 - 349	32	758 - 771	63	1 180 - 1 192	94
350 - 363	33	772 - 784	64	1 193 - 1 206	95
364 - 376	34	785 - 798	65	1 207 - 1 220	96
377 - 390	35	799 - 812	66	1 221 - 1 233	97
391 - 404	36	813 - 825	67	1 234 - 1 249	98
405 - 417	37	826 - 839	68		
418 - 431	38	840 - 852	69		
432 - 444	39	853 - 866	70		
445 - 458	40	867 - 880	71		
459 - 472	41	881 - 893	72		
473 - 485	42	894 - 907	73		
486 - 499	43	908 - 920	74		
500 - 512	44	921 - 934	75		
513 - 526	45	935 - 948	76		
527 - 540	46	949 - 961	77		
541 - 553	47	962 - 975	78		
554 - 567	48	976 - 988	79		
568 - 580	49	989 - 1 002	80		
581 - 594	50	1 003 - 1 016	81		
595 - 608	51	1 017 - 1 029	82		

Qualifying limits for acceptance based on different numbers of test results for each grouping of characteristics are listed in table 4 given as a percentage of the results, assuming an acceptance probability of at least 0.95.

Table 4

Number of test results of each characteristic	Qualifying limits shown as a percentage of results. Acceptable level of 1% of non-complainces.	Qualifying limits shown as a percentage of results. Acceptable level of 6.5% of non-compliances.
1 250	1.68	7.91
2 000	1.52	7.61
4 000	1.37	7.29
6 000	1.30	7.15
8 000	1.26	7.06
10 000	1.23	7.00
20 000	1.16	6.85
40 000	1.12	6.75
80 000	1.09	6.68
100 000	1.08	6.65
1 000 000	1.02	6.55

Annex 8

MINIMUM REQUIREMENTS FOR SPOT CHECKS BY THE ADMINISTRATIVE AUTHORITY

1. GENERAL

The conformity requirements shall be considered satisfied from a photometric, geometrical, visual and electrical standpoint if the specified tolerances for production filament lamps in the relevant data sheet of annex 1 and the relevant data sheet for the caps are met.

2. The conformity of mass-produced filament lamps shall not be contested if the results are in agreement with annex 9 to this Regulation.

3. Conformity shall be contested and the manufacturer requested to make the production meet the requirements if the results are not in agreement with annex 9 to this Regulation.

4. If paragraph 3 of this annex is applied, a further sample of 250 filament lamps, selected at random from a recent production run, shall be taken within two months.

Annex 9

COMPLIANCE APPROVED BY SPOT CHECK

Compliance approved or disapproved shall be decided according to the values in table 1. For each grouping of characteristics filament lamps shall be either accepted or rejected according to the values in table 1*.

Table 1

Sample	1%**		6.5%**	
	Accept	Reject	Accept	Reject
First sample size: 125	2	5	11	16
If the number of non-conforming units is greater than 2 (11) and less than 5 (16) take a second sample size of 125 and assess the 250	6	7	26	27

Note * The proposed scheme is designed to assess the compliance of filament lamps to an acceptance level of non-compliance of 1% and 6.5% respectively and is based on the Double Sampling Plan for Normal Inspection in IEC Publication 410: Sampling Plans and Procedure for Inspection by Attributes.

Note ** The filament lamps shall be inspected and test results recorded following the grouping of characteristics as listed in annex 7, table 1.